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In This Issue—Saginaw Used Car Plan

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# MOTOR AGE

Vol. XLI  
Number 11

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, MARCH 16, 1922

Thirty-five Cents a Copy  
Three Dollars a Year

*Four vital convincing  
facts about the  
Jordan dealers propos-  
ition will interest real  
business men who want  
to make money in 1922-  
and in years to come-  
no matter what your  
present situation-  
I'll send them on  
request—*

*Edward D. Jordan  
— Cleveland —*

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PISTON RING COMPANY

MARYLAND



**NO-LEAK-O** *Piston Rings*  
WITH THE ORIGINAL OIL SEALING GROOVE





# MOTOR AGE

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Vol. XLI CHICAGO, MARCH 16, 1922 No. 11

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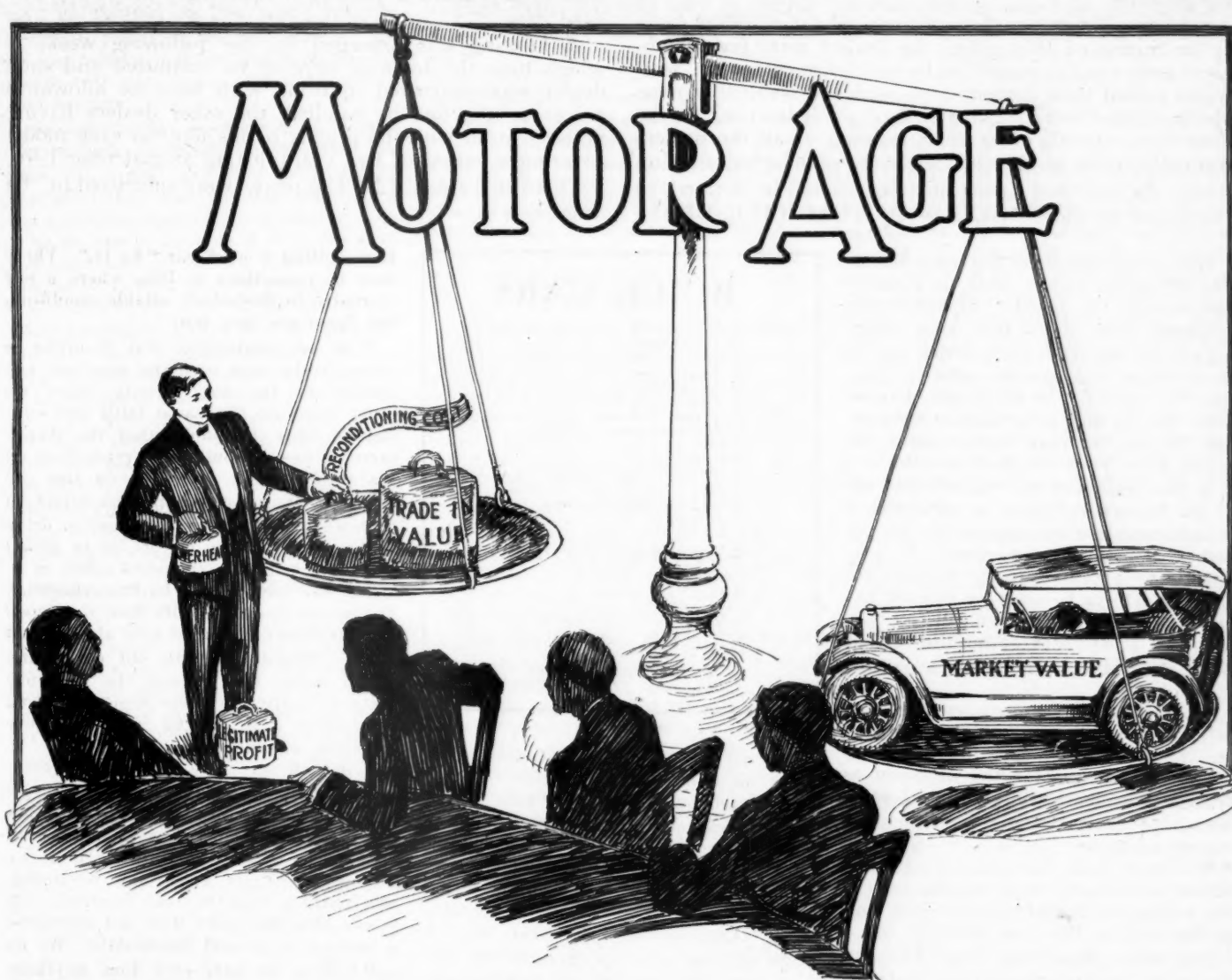


*We have the franchise!  
We have the car!  
You have the territory!*

*Write and ask about them.*



**BELL MOTOR CORP.**  
**YORK, PA.**



## *The Saginaw Dealers' Plan of* **Making Money on the Used Car**

*SIX Years' Trial by the Members of the Saginaw Dealers' Assn. Has Shown It to Be Practical and Profitable—Cleaner Competition and Greater Cooperation Has Resulted in Benefits to All*

By GUY S. GARBER

*President of Michigan Automotive Trade Assn.*

**I**N the last twelve months our Saginaw Auto Dealers Association has been bombarded with requests from all parts of the country, from dealer and other trade organizations, for the explanation of what they are pleased to designate as "The Saginaw Plan." I do not maintain that our solution of the Used Car question is the only one, but I do know that it has been proved practical in our city, that it has produced the results and "by their works shall ye know them."

It seems to me that every dealer should be interested

in knowing how problems which confront him are solved elsewhere and I will try to make this digest of our Used Car solution as plain and explicit as is possible.

Our plan, as I will try to outline it, is based entirely on the faith we have in our competitor. We are blessed, here in Saginaw, with a lot of very good dealers, much better—we think—than in the average town of our size. We are completing the sixth year and our plan is working very satisfactorily. We know we could not successfully retail



cars here without the co-operation we are getting from our competitors.

Realizing the seriousness of the used car situation early in the Spring of 1916, when the dealers were giving fabulous prices and it seemed to be the desire of certain dealers to outbid their competitors—with the result that none of the dealers were making money, or at least not in the proportion that they should, a meeting of all the dealers was called early in March. After the evening's discussion it was decided that an organization should be formed, to be known as the SAGINAW AUTOMOBILE DEAL-

ERS' ASSOCIATION. Its principal purpose at that time was to formulate a plan on which we could all handle used cars.

A meeting was arranged for the following week, at which time the by-laws were to be submitted and each dealer was instructed to bring with him the allowance prices on the line he handled, the other dealers having nothing to do with the pricing of his line, on each model covering a period of five years, listing at that time 1916, 1915, 1914, 1913, 1912. The prices were submitted by the dealers.

They were compiled and each dealer was furnished with a copy in a loose-leaf vest-pocket booklet, alphabetically arranged, and since that time every dealer and salesman has carried one of these books. (A sample sheet is illustrated at right.) The prices are changed from time to time as conditions warrant, and during the past eight months the prices have been changed materially.

In the beginning we realized that one of the important things to make this a success was for the dealers to get together regularly and often. Consequently we arranged, in our by-laws, for a fine of \$10 to be assessed against any dealer who did not answer roll call. No excuse is accepted excepting illness. We think this helped wonderfully in getting a good start.

We also, at that time, found it would be necessary to get our retail forces sold on this idea of co-operation, and immediately we accepted the salesmen as associate members. When the salesmen were sold on this idea it overcame the biggest obstacle.

We now have a monthly meeting, which includes the total membership of the automotive industry in our city. Our membership at this time numbers 105.

The active members, those who are the heads of concerns having contracts for the sale of cars, have a meeting every Monday noon. This meeting is devoted to matters pertaining to the sale of cars.

### *How the Trade in Allowance Is Fixed*

In regard to arriving at the price we allow for Used Cars, I will give you the following example:

On the 1920 Buick K-45, five-passenger touring car, we first take into consideration what we could sell fifty K-45s for, thoroughly rebuilt, painted and in first-class condition. Our experience led us to price this model at \$900. In other words, it was the judgment of my organization that we could sell good K jobs for \$900 each, after they were put in first-class condition. Then we figured it would cost on an average of \$180 to put a K job in first-class condition, that means rebuilt, painted, a new tire or two, and placed on the salesroom floor looking like a real piece of merchandise. Taking \$180 from \$900 leaves \$720. Then we put the price allowance on the K-45 at \$600 and add 20 per cent to our investment for profit, which is \$120, plus \$180—cost of making real merchandise

## BUICK CARS

1921	44-45 T. and R.	\$ 850
	49 7-passenger Tour.	900
	46 3-passenger Coupe	1100
	47 5-passenger Sedan	1200
	48 3-passenger Coupe	1250
	50 7-passenger Sedan	1300
1920	K-44 and 45 T. and R.	600
	K-49 7-passenger Touring	650
	K-45 Coupe	900
	K-47 Sedan	950
	K-50 7-passenger Sedan	1000
1919	H-44 and 45 T. and R.	500
	H-49 7-passenger Touring	550
	H-46 Coupe	600
	H-47 Sedan	650
	H-50 7-passenger Sedan	700
1918	E-44 and 45 T. and R.	400
	E-35	400
	E-49	400
	E-46 and 47	500
	E-50	550
1917	D-44 and 45, 34-in. wh.	300
	D-35	150

Garber Buick Company  
Dec. 27, 1921

of the car, making a total of \$900. This gives us a fixed selling price of \$900, and a fixed buying price of \$600, which is easily explained to the customer. No intelligent customer expects you to take in a used car and not make a legitimate profit. One half of our business today, in dollars and cents, is used car business. Consequently we must have a profit on used cars, as there is not volume and profit enough on new cars to carry the overhead in our Used Car Department, and we must have a profit that will warrant our investment.

One very important point is: That the public must be educated to the depreciation on cars. Instead of telling a customer, as we did in the past, that he can buy one of our cars and drive it at less depreciation than any other make of car, we are now telling him—at the time of selling—that the depreciation the first year will be approximately 40 per cent, the second year 20 per cent of what is left, the third year 25 per cent of the balance, the fourth year 20 per cent, and the fifth year 20 per cent. This is an effort to educate them that they must expect to pay the depreciation. Figure this on your own car and you will see that, in round numbers, this is a fair depreciation, providing you expect to make a profit on Used Cars.

The prices we carry in our book are the maximum allowances for cars in good condition. If the car is in bad condition deductions should be made in proportion to its condition.

Another very important point is: The condition of the car when it is sold. There is nothing, in our judgment, worse

than selling a used car "As Is." There may be exceptions to this, where a car is really in first-class salable condition, but there are very few.

It is our contention that in order to successfully cope with the used car situation for the next twenty years we must build up the same faith and confidence with the public that the manufacturer has—in building a reputation on his product. In order to do this we must put the used car in such condition that we would not be ashamed to drive it through our main streets, or be afraid to take a trip of a thousand miles in it. When the car is put in this condition and set on our salesroom floor it is good merchandise and can be sold at the right price. Patching up an old car, using cheap paint, etc., is not the way our factories build up their reputation and we believe it is just as much our duty to build confidence in used cars. In fact, we all agree that we must successfully handle used cars in order to successfully handle new cars. It resolves itself into making real merchandise of used cars, which can only be done by buying at a fair price and rebuilding and putting them in real condition. It is our idea that price does not represent a bargain on a used automobile. We do not believe we have ever done anything in our lives that has injured our business and our future as much as selling used cars "As Is." The public must be taught that we have got to buy these used cars at a fair price so we can rebuild them, and they also must be taught that we are entitled to a profit on used cars just as much as we are entitled to profit on new cars.

### *Figuring the Year's Replacement Business*

Now, without the co-operation of the dealers, and with one dealer bidding against the other, it is impossible to educate the public to the real value of used cars.

As stated before, at our Monday noon luncheon are the heads of every retail establishment in our city and they are there as a board of directors, directing the destinies of the retail automobile business in our city.

There are approximately 12,000 cars registered here, and we believe that eight years is a fair average life of an automobile. This means that there is an actual replacement of cars in our city, each year, of 1,500 automobiles, and that a conservative estimate of the deal-

er's profit, per car, will average \$200. This means that the public is ready to give us \$300,000 on this year's renewal business, providing we will take it. We do not believe that the public wants cut prices. It does want fair dealing and real service.

On our Monday noon meetings depend the success or failure of our used car plan. If a deal has been made during the week that does not look right, it is put up to the dealer at this meeting. Or if he, or any of his men, during the week has used any of the old cut-throat tactics, such as knocking his competitor or the competitor's product, or any of the other numerous things that go with the old style way of merchandising, it is a very uncomfortable place for this dealer. If he has been called on the carpet once, he does not want to be called again. We have found in the past few years, very few occasions to call the dealer on the carpet. The fact is, every one of the dealers know that the success of his business depends upon this organization. Consequently they are glad to co-operate.

#### Harmony and Cooperation Among Members

At the weekly meeting it is our purpose to cultivate harmony and co-operation among the dealers. At this meeting matters of importance to the industry are taken up by the chairman, and then the chairman calls on each man for anything he has to take up. The purpose of this is, if a dealer thinks another dealer is bidding more for a used car than the book allowance, it is his duty to take up the matter at this meeting. There is no penalty whatever if a dealer pays more for a car than it is listed at, but every dealer realizes that if he pays more for a car than it is worth, it is doing an injury to our industry. If a dealer does cheat and comes to the Monday noon meeting it is a mighty embarrassing place for him. If he does not come to the meeting it is evidence that he has cheated and does not dare to come. This being the understanding, we usually have a full attendance.

If a dealer comes to the meeting, thinking that one of the other dealers is paying more for a used car and does not take up the matter, going away with the same thought he had when he came, then the meeting is a failure. But if he does take it up with the dealers, or the particular dealer he is concerned in, he will leave the meeting with the satisfaction of knowing this dealer is not paying too much for used cars. In practically every instance we find that the dealer is not paying more than the allowance price as the customer often misrepresents the statement of the dealer.

We have found a very satisfactory way to correct this. When we call on a customer and make him a proposition on his old car and he says such and such a dealer called the day before and made him such and such a price on his old

car, we do not dispute him but ask to use his telephone. We call up the dealer mentioned and ask him why he offered such and such a price, as it does not agree with our book allowance—we must have an old book or have the wrong prices in some way. In every instance we find that the dealer comes back in a very loud voice—loud enough to be heard by the customer standing near the phone, that he—the dealer—did not make any such proposition. This sometimes is embarrassing to the customer.

#### Educating the Owner on Used Car Values

Our plan has been in operation so long that the public is fairly well educated regarding the value of its used cars, and we believe that before the year is over we will have a page in our local paper once a week, paid for by the association, on which each dealer will quote his allowance prices. Then the customer can see what the price is on his car, just the same as though he were looking for the price of wheat, corn, etc. We believe this will assist in teaching the customer the actual value of his car.

The question often comes up, is it fair to give every man the same price for his automobile, regardless of the mileage and condition. We find, from experience, that there is very little actual difference between cars of a certain age. Practically every one should be rebuilt, painted and a certain amount of top and trimming work done. In taking fifty jobs our experience is that they will vary very little in the actual cost of putting them in marketable condition. Whether a car has been driven 4,000 or 20,000 miles we find no difference in the resale value. When the car is properly rebuilt the man who buys the car with the longer mileage gets just as good value as the man who buys the car with the lesser mileage.

We make a proposition to the man

who has taken exceptionally good care of his car, or who has just had it rebuilt, painted, put on new tires, and then decides he will buy a new car. We will not trade and allow him one dollar more for this car. On the other hand, the customer will not accept the allowance price. If we can find a buyer and sell his car for more than the allowance price, we accept the used car order and submit it to a committee of three to investigate. If they find the car is in exceptionally good condition and that it is sold, the committee O. K.'s the deal. After the used car is sold and delivered, then we deliver the new car to the customer on a straight sale basis. However, we find these cases are very few.

In handling used cars we think there are two big things involved. The biggest thing is the condition of the used car when we sell it. The other is buying the car at a price that will allow us 20 per cent commission on our investment.

#### Do Not Vary From Maximum Trade in Allowance

In a few words—our plan is simply this: We, the Buick dealers, list our cars at the maximum price we would give for them in good condition, meaning by "good condition" the average car as we find it in every-day trade-ins. If the tires are worn out, or the fender smashed, or the car is in otherwise damaged condition, we buy it for the least amount possible. The allowance listed in our book means that it is the most we will give for the car, regardless of its condition. Other dealers list their cars with the same understanding and we simply live up to these prices. We know, from experience, that it can be done. This merely puts us on an equal competitive basis and allows us to sell our new merchandise on its merits.

*This article was prepared for the Michigan Automotive Tradesman*

### Comparison in Factory Prices on Ford Cars from August, 1909, to January, 1922

This interesting and valuable reference table showing the price history and engine numbers of Ford cars hangs in the showroom of the Rude Motor Co., Ford dealer in Perry, Ia.

Date.	Engine No.	Tour.	Roadster	Coupe	Sedan	Chassis	Truck
August, 1909	8107	\$850	\$825	\$950			
August, 1910	30200	950	900	900	1050		
August, 1911	62100	780	680	680	1050		
August, 1912	139700	690	590	590			
August, 1913	298200	600	525				
August, 1914	517800	490	440	750	975		
August, 1915	881000	440	390	590	740	360	
August, 1916	1362213	360	345	505	640	325	
August, 1917	2113500	360	345	505	645	325	600
August, 1918	2765250	525	500	650	775	475	550
March, 1920	3817431	575	550	*850	*975	525	600
August, 1920	4233351	575	550	*850	*975	525	640
September, 1920	4329901	440	395	*745	*795	360	545
June, 1921	5008001	415	370	*695	*760	345	495
September, 1921	5337546	355	325	*595	*660	295	445
January, 1922		348	319	*580	645	285	430

\* Includes starter and demountable rims.



# Possibilities of Shows Hampered by Poor Salesmanship

**SALESMEN Spend Too Much Time in Gossiping Among Themselves and Are Not on Toes When Mr. Prospect Enters Booth—Investigator Finds Evidence of Knocking Competitor Cars**

By S. A. MILES

Manager of the National Automobile Shows

**N**O MATTER how successful the shows may have been in the matter of financial returns, I feel that we have a responsibility in determining to what extent they have been successful in other ways and what steps are necessary to insure their permanent value.

It has probably become evident to most observers that salesmanship in the automobile industry has not reached the peak of perfection.

For 15 years or more we have enjoyed a condition which, in some respects, has an unfortunate influence on some of the salesmen of today. In many cases it has not been necessary to devote great energy or skill to the sale of cars. Some of our salesmen have grown into the habit of being approached rather than approaching. This condition was in evidence at the New York show.

The Chicago Automobile Trade Assn. made an earnest endeavor to change the conditions. The directors prepared a list of questions and answers to be placed in the hands of salesmen. The questions were submitted to, and criticized by, 57 of the principal Chicago dealers, but even after that they were not ideal. They were printed and placed in the hands of the attendants at the exhibits.

## Checking Up On the Salesmen

The association appointed one or more representatives who were unknown to the salesmen, whose business it was to circulate through the building and ask questions of the salesmen. A prize of \$50 was awarded each day to the salesman who gave the most logical answers and deported himself most satisfactorily. In order to be eligible the salesman was required to wear a badge provided by the association. A report of results was sent to each member daily.

The association has furnished me with a portfolio containing all of the documents issued by the association in connection with the show. It contains not only the questions and answers above referred to but other information which might have been useful to the salesman, including many items taken from "Facts and Figures" and other documents issued by the National Automobile Chamber of Commerce.

The most important feature, however, is the report of investigators. This report was issued on January 30, and sent to all members of the Chicago association. It embraced a detailed report of the investigators' experience and set forth the following:

"Several salesmen eliminated themselves from Saturday's contest by standing around and talking among themselves and not paying attention to 'Mr. Prospect' when he called. Don't make that mistake again.

"Several others evidently concluded that 'Mr. Prospect' was a 'boob,' 'dumbell,' 'hick,' or 'mere looker.' They didn't offer to interest him in their cars notwithstanding he looks like the ready money.

"Several other salesmen eliminated themselves by knocking other cars, calling them 'awful cans,' 'junk,' etc.

"Several other salesmen stood around and talked and giggled with some girl friends, while 'Mr. Prospect' was trying to learn something about their car.

"Mr. Prospect' found several men who were close contenders for the prize—but they were a little 'short on the eight questions and answers.'

The report of February 1 contained this paragraph:

"On the whole the men are very attentive and courteous, although one general trouble is that they stand about and gossip with each other and neglect visitors.

"Salesmen paid no attention whatever to my presence in the booth. There were two or three unoccupied. One of them nearly fell over me in passing but did not even stop to apologize. Went back the second time but they were as independent as before.

"Stopped at this booth three times but received no attention although some of the salesmen were only occupied in discussion among themselves.

"Hung around this booth for quite some time but all the salesmen were too busy among themselves to show me any attention.

"At the time I called at this booth, there were no prospects there. Four salesmen were having a conference and paid absolutely no attention to me although I was around the booth for about ten minutes looking over the cars and waiting for one of them to approach me.

"There are some who have become so blase that they assumed the attitude of an exhibition attendant rather than a salesman.

"We find that gossip among the salesmen is on the increase and the public in some cases is not receiving the attention it has a right to expect.

## Some Disappointing Treatment

"I visited this booth upon three different occasions and received no attention whatever. I noticed only one badge in the booth and I angled in an endeavor to get this man to approach me, but he was leaning against the wall and talking to another man or two and apparently wasn't on his toes.

"I visited this booth twice but was unable to find a badge upon either occasion.

"I am quite surprised at the general demeanor of the salesmen at this exhibit. I had expected to find them a very aggressive organization, but I was keenly disappointed. I did not succeed in getting the man's name to whom I talked, but he was not worthy of consideration, not for the reason that he was lacking in appearance or that of courtesy, but more on account of his lack of knowledge of the automobile business in general and his product in particular; was unfamiliar with questions and answers.

"Visited this booth twice and in each instance no salesman upon the floor wore a badge.



"There were no salesmen here with badges.

"This company has a spieler in its booth talking its car. Upon my call there I found the salesmen were more deeply interested in listening to this man's talk than they were in greeting the public. I made my second call at this booth and was not approached.

"On the last two days of the show the investigator found an improvement but several men made the mistake of knocking other cars. There were fewer cases of inattention on the part of the salesmen."

The winners of the prizes were as follows:

January 28—Paul W. Rader, Magnetic Motor Corp., representing the Stevens-Duryea Co.

January 30—P. D. Weeks, R. & V. Knight Co.

January 31—Russell Robinson, Irwin Greer Auto Co., representing the Stutz Motor Car Co.

February 1—Holmes K. Mercer, Allison-Rood Co., representing the Lincoln Motor Co.

February 2—J. S. Deutsch, Studebaker Sales Co.

February 3—Frank Binz, Jr., Mitchell Auto Co.

The lesson we may learn from these conditions is, I think, that the exhibits lack adequate supervision. Year by year the men at the top become more and more conspicuous at show time by their absence. This has been particularly noticeable at Chicago. On one day of the show, in an endeavor to obtain an answer to the question so frequently asked, whether any actual business was being produced, I made a personal visit to every exhibit in the Coliseum. My acquaintance in the industry is fairly extensive but I was able to find only three men of my acquaintance and only one of these was a factory representative of major importance. The same remark is true of casual visits made at other times during the week. It is also true of my visits during the New York show.

## Salesmanship at the Shows

**B**BETTER salesmanship is needed before the automobile shows can realize their maximum possibilities, according to S. A. Miles, show manager, reporting to the members of the N. A. C. C. Conditions at Chicago were somewhat better than at New York due largely to the earnest efforts of the Chicago Automobile Trade Assn. which offered daily prizes for the best salesmanship and kept up constant investigation of conditions. The report of Miles is an interesting analysis of our national exhibits.

On many occasions it is necessary for us to get into communication with the gentlemen named in the show contract as the official representative of the exhibitor. I think it perfectly safe to say that not once in four times did we find the representative in the building. That the Chicago investigators' reports are true, I know from the fact that not in a single instance during my trip through the building was I accosted by a salesman.

It is my belief that if the shows are to continue successful in all respects, a higher order of salesmanship must be developed under the eyes of the members and their higher class representatives.

## Atlanta Dealers Introduce Novel Advertising

**W**HY not adopt a good "creed" for your service station and feature it in your newspaper advertising?

The Ansley Garage Co., operators of a large station in Atlanta, Ga., are obtaining excellent advertising results by this method.

Here is the "creed" as formulated by this company:

"We believe in the stuff we are handing out, in the firm we are working for and in our ability to get results.

"We believe in working, not weeping, in boosting, not knocking, and in the pleasure of our work.

"We believe that honest stuff can be passed out to honest men by honest methods.

"We believe that a man gets what he goes after, that one deed done today is worth two done tomorrow, and that no man is down and out until he has lost faith in himself.

"We believe in courtesy, in kindness, in generosity, in good cheer, in friendship and honest competition.

"We believe there is something doing somewhere for every man ready to do it. We believe we are ready — RIGHT NOW."

### Another Way of Preparing "Copy"

**T**HE Motor Tire Co., of Atlanta, Kelly Springfield tire dealers, and operators of the largest tire repair shop in the South, obtained some good advertising results recently with a series of ads calling attention to their tire service rendered for special classes or profes-

sions, such as doctors, bankers, etc. The idea is best conveyed to your mind by briefly describing an ad of this nature recently used. The ad in question was headed, "ASK YOUR DOCTOR," the body of same running as follows:

"Your doctor knows something besides pills and tonics. He probably knows Motor Tire Service—for a great majority of Atlanta doctors use our service exclusively. These doctors know that time with them may mean life or death, and they have learned that our service is not only prompt, but dependable and efficient. We repeat—"Ask Your Doctor."

An advertisement along the same lines was used with the banker, etc.

### "Tying in" News With Advertising

**A** GOOD illustration of where a dealer "tied in" the news of the day with his advertising, recently appeared in an ad of the Georgia Auto Supply Co., of Savannah, Ga. Taking advantage of daily events in this way sometimes affords the dealer a good opportunity for worthwhile publicity. The case in question was that of Larry Dimmitt, head of this Savannah company, who had advertised a big used car sale. But on the day of the sale it rained heavily and he postponed it. That evening, however, he took advantage of the rain by inserting the following ad in the Savannah evening papers:

I AM WORTH \$1,000,000 A YEAR TO THE FARMERS OF GEORGIA

I can bring rain any time by putting on a used car sale.

Soon as it stops raining I am going to put on absolutely the biggest used car sale ever held in Savannah.

Watch for our big advertisement as soon as the sun comes out.

Larry Dimmitt.

### THE GIANT PNEUMATIC

**S**INCE the giant pneumatic tires have been advocated for use on busses there has been a great deal of speculation as to what would happen if there was a blowout on one of these. It has been contended by many that this would cause the vehicle to upset and that it might be injurious to anyone standing near when the blowout occurred. This discussion became especially acute in England where these giant pneumatics are used very freely on busses. So, to decide the question E. R. Preston, managing director of the Goodyear Tire & Rubber Co. of England staged a special blowout. This was accomplished by setting a knife edged spike beneath the surface of the roadway so that it could be raised in time to cut the rear tire of a bus.

The result was a blowout and the tire was complete flat within 15 feet but there was no damage except to the tire. The men in the vehicle felt only a slight jolt and the man who manipulated the spike stood close by the roadside and was not seriously affected by the result. There was no lurching of the vehicle and the corner of the bus over the deflated tire settled only one and one-quarter in.

# System and Records Necessary in Operating Under Fixed Price System

## *HOW the Cruse-Crawford Co. Has Applied Good Management to Its Business of Servicing Automotive Vehicles Under the Flat Rate Method*

ONE of the best arguments we have as to the practicability of the flat rate or fixed price system of selling automotive repair work is to point out occasionally the success which those concerns are having with it who apply it correctly and follow it up thoroughly. It calls for system and records, yes, but what business is there that can be intelligently and successfully handled without system and records?

It is just as necessary to keep a time record on a repair operation under the flat rate system as with any other system, even though a fixed price has been established for the job. This is so because in time new methods of operation may be adopted, new equipment added, the engine or car may be altered in design and construction a little so the method of procedure may be affected and there may be other factors to enter. Therefore, the time record is important because ultimately it may mean a new "bogey" for the job.

The flat-rate system has been in use now for some time at the Cruse-Crawford Manufacturing Co., Birmingham, Ala., operating one of the largest service stations in this territory and the system has proven very successful.

When a car is brought in for repairs it must, of course, be given a very careful and thorough inspection by one who is entirely conversant with its mechanical construction, one in fact who is capable of accurately diagnosing its ailments and who can estimate with more or less precision just what it is going to cost the company to make those repairs. Otherwise where the flat rate system of service operation is practiced losses are very likely to result due either to inaccuracy in making the estimate, or to overlooking certain repairs that it may be later ascertained are requisite.

This, of course, is more important where the customer wants such repairs as the car may really need, regardless of what they may be. It is the less important as can be readily seen if the customer happens to want only

Fig. 1—This is the initial repair tag which is filled out by the inspector

Fig. 2—Here is shown the card which is attached to the car as it goes through the shop

certain repairs which he himself may specify, and does not wish to go to the expense of any other repairs that the inspection of the car may show are necessary.

### *The Repair Ticket*

Figure No. 1 is known as the repair tag and is the initial form filled out by the inspector. The first step in the operation is to carefully examine the car and its mechanism. When this is done the inspector knows precisely what repairs the car may need. However, there are three kinds of customers to deal with and here the element of service salesmanship enters into the transaction.

(1) The average customer is a layman and as a rule unfamiliar with the technical details of the car. He may know that the car has need of certain repairs and he will specify that these repairs be made. With some customers no amount of argument will avail and they will authorize only such repairs as they had in mind when entering the station.

(2) Then there is the customer who is open to argument, and who can be prevailed upon to have all, or at least part, of the repair work done that the car really needs, even though that cus-

tomers, too, may have had only certain repairs in mind when he entered the station. An inspector who not only understands the mechanical side of the business, but who is also more or less conversant with the principles of salesmanship, has a pleasing personality and a convincing way about him, can obtain a considerable volume of additional business for a service station.

(3) The third customer is he who will take the inspector's word for it and authorize such repairs as are recommended. Truly this is a valuable sort of customer to have.

### *Customer Signs Order*

It will be noted from an examination of Figure 1 that the repair tag is somewhat more detailed and complete than such a form as used by a majority of service stations. It has resulted, however, from several years of experience in service work, a fact which should be borne in mind relative to the entire system as herein described.

Inspection of the form, too, will show the precise information that should be listed without the necessity of discussing the matter here. One interesting and valuable feature it will be noted is the space provided for the customer's phone number. Good will is built by phoning the customer promptly when the job is ready, which is also centered on this form.

Another interesting feature is the fact that the customer is asked to sign this form twice, first authorizing the repairs over his own signature, and second signing at the bottom when the car has been duly delivered. While no form is provided on the opposite side of this card for that purpose, to guard against error the time required on the job and all parts used are written on the back of it. This provides a double record as there are requisitions also for this purpose.

Figure No. 2 represents the card that is attached to the car while it is going through the shops. This number, of course, should correspond with that of the repair order on the form illustrated by Figure 1. When the job is finished and the car ready for delivery the bottom is torn off. The top is left with the car and the bottom part then sent to the general offices where it is filed with the other forms used on this par-



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# "Cashing In" On What You Can Best Do

*How a Dealer Capitalizes His Knowledge of Automobile Design and Maintenance to Make Sales*



A. L. BELLE ISLE

"IT doesn't make a particle of difference what a man is selling, he should know more about that article than the man he is trying to sell it to. Especially is this true in the selling of automobiles. In the automotive industry the real salesman of today is the one who has a thorough mechanical knowledge of the motor car or truck he is selling; he should be familiar with the technical construction of that car from radiator to rear axle. Such knowledge is just as important to the salesman, in my opinion, as it is to the foreman of the service shops, or to the mechanic who does the work on the car or truck in the service station."

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This is the manner in which Alvin Looney Belle Isle, of Atlanta, Ga., expressed his views of the modern automobile salesman. And, inasmuch as he has practiced exactly as he preaches for a number of years with a most remarkable degree of success, it can be taken for granted that Belle Isle ought to know what he is talking about.

When people think of the Ford car in Atlanta, they think of Belle Isle. Last year—1921—his Atlanta agency sold

more Fords than any other Ford agency in the southeastern territory. Sales were between 900 and 1000 cars, of which 600 or more represented new cars. And Belle Isle himself sold about 25 per cent more of these cars than any individual member of his sales force.

"I am a mechanic as well as a salesman," he said. "And that is the reason I often make a sale where the other fellow fails to do so."

Belle Isle first entered the automobile business as a mechanic with the White Motor Co., later working in the service station of the Goldsmith Co. in Atlanta. One day a large passenger car was brought into the station for repairs. It had been in a wreck and was in a very bad condition.

## Starts as Cab Driver

Having saved a bit of money, Belle Isle offered to buy the car as it stood, and the owner accepted. Whereupon Belle Isle took a chance, quit his job, overhauled and repaired the car himself and started in the taxicab business in Atlanta.

At that time he operated only this cab and drove it himself. Today he operates a string of cabs and employs a flock of drivers, in addition to owning one of the largest Ford agencies in the south.

And one of the primary reasons Belle Isle's Ford agency has been successful is due to the fact that he, being an expert mechanic as well as a salesman and knowing the big advantage this combination affords, has endeavored to employ men on his salesforce who could also be classed as "mechanical salesmen."

Averaging sales of more than three cars for every working day during 1921—a period when the industry was in the throes of business depression—evidences beyond doubt the stability of Belle Isle's idea.

To illustrate a case where a technical knowledge of the car resulted in a sale that otherwise would have been undoubtedly lost, Belle Isle tells of an incident during the period he was selling the Graham truck. This particular sale represented the first Graham truck sold in Atlanta, the purchaser being the Fulton Bag & Cotton Mills.

This company had let it be known that it was in the market for a truck, and several companies were endeavoring to make the sale. Naturally, the closing of the deal was a matter of considerable difficulty and something more than real salesmanship was required.

The company had decided upon a

series of tests and stated that the truck which performed most capably during these tests would be purchased. The tests were to include speed, hauling capacity, consumption of oil and gas, test in overloading, etc., etc.

Now, it is well known that a driver who has a thorough mechanical knowledge of a machine can make it perform much better than one who does not possess that technical knowledge. Expert familiarity with the motor and construction of the vehicle gives to the driver a tremendous advantage when he happens to be in competition with others who may not be mechanical experts like himself.

In the competition Belle Isle, driving his entry, made the Graham perform some remarkable work, and in every one of the tests he stood at the top. He accomplished this for the one and only reason that he was a mechanical expert, that he knew the technical construction of the truck from front to rear and top to bottom. His competitor drivers were just average salesmen who did not possess this expert knowledge.

When the tests had been completed, the Fulton Bag & Cotton Mills purchased the Graham truck, and later they purchased other Grahams from Belle Isle, so his mechanical knowledge really meant several sales.

This is only a single instance of a hundred sales of similar nature that Belle Isle tells, but it is ample to evidence the real value of mechanical knowledge in modern automobile salesmanship.

## Ford Makes Improvements in Equipment

A NEW type headlamp lens, known as the Ford H, is now being fitted as standard equipment on all Ford cars and is being supplied to branches and dealers for service and replacement. The lens has vertical flutings and is used in connection with a 21 candle-power gas filled bulb with clear glass. The lens is said to meet the requirements of all state laws. Other improvements that have been recently made are the improved wiring system, which meets the requirements of the Fire Insurance Underwriters; the pressed steel muffler, which replaces the muffler with cast ends and brackets; the redesigned pistons and connecting rods, which have been made lighter; the one-piece running board brackets; the improved fan assembly; the new design starting switch, and the dash weather trough to keep water from the coils.

## How an Automobile Show Was Presented as a

# Civic Institution and a Social Event Which the Public Couldn't Afford to Miss

*INSTEAD of Letting It Be Considered Merely As An Assembly of Cars, Portland Dealers Decided to Glorify Their Show as a Field Day of Motor Transportation Which Would Mark an Epoch in the City's Annals—Read How It Was Done*

PORTLAND, Ore., has just held its most successful of 13 annual automobile shows. Better attended than ever before with a nice fat pile of orders with checks attached in the hands of half the dealers who took part. Any dealer will tell you that the 1922 show exceeded expectations.

This year's annual focus of motoring interest was a brand new deal, for Portland, and for the first time the big event was made an important civic institution. The public accepted the show not as an automobile market, a showing of a lot of different cars, but as the field-day of motor-transportation, a civic and social occurrence of wide general interest.

As in other towns, the 1922 show was debated pro and con with considerable interest. Portland decided to have a show.

Having undertaken the task of staging again the annual \$30,000 exhibit, the directors held many serious minded meetings and arrived at an early conclusion that this show would have to be presented to the public in a different light if it was to make its mark and be counted in the list of the successful ones.

It was argued that success lay in the advertising campaign, or rather the public's reception of the show through publicity as something more than a motor market.

### A New Idea in Show Decorations

First of all came the selection of a setting for this display. At the very outset the plans of commercial decorators who handle county fairs and conventions of the fraternal orders and street carnivals were thrown into the discard. The work was given to a group of artists who had instructions to produce something different. They did. The papers called it a "pagan symphony of light and color." Visitors from east and west were frank to state that the public had never seen an automobile show like it. It was as far removed from the conventional as the Solomon Isles, and much more like them. Around the walls of the great auditorium danced a hundred nymphs in glens of rather startling trees. Every corner of the three story block square building was embellished in the same manner of the Academy of Fine Arts of Boston.

It took with the public. The morning after the opening it was the talk of the town and the gate began clicking faster. It was the touch of the original that immediately stamped the 1922 show as something not the "same old thing."

But before the opening, advertising plans of the show also underwent a change and all copy and publicity began hitting the show and not the cars.

With greatly diminished ranks of dealers, the directors were

confronted with the probability of having the annual show editions of the Portland papers tell the public that the automobile business had indeed undergone a change, the very smallness of the sections indicating that the business wasn't what it used to be. Its effect on the show was without a doubt a point to be considered.

From this developed the campaign to sell the "show" to the public as an event and not a motor market, that without doubt got the thing over.

A space budget for the local papers was first considered. This was designed of sufficient size to carry dominating position in the four Portland dailies through the ten days preceding the show. All copy was at least five columns by 16 inches and all text and illustration sold not the cars at the show but the show. All newspaper publicity was built around the same idea. It drew the gate and subsequent happenings show that it got and stimulated the buyers.

### Every Form of Advertising Used

But the newspaper advertising was only part of the publicity campaign. Summarized, the general publicity prepared by Ralph J. Staehli, secretary of the Automobile Dealers' Association and manager of the show, covered the following fields:

- Newspaper Advertising.
- Newspaper Publicity.
- Posters and Window Cards.
- Direct Mail Advertising with the Trade of the State.
- Windshield and Hand Literature (dealer's helps).
- Trade Broad-sides.
- Local Trade Magazine Special Editions.
- Speakers and Special Features, including:
- Speakers at All Weekly Meetings of Civic Clubs.
- Coaching all the Field Men of the Accessory and Equipment Distributors.
- Letters and Literature Distributed by All Accessory and Automobile Dealers.
- An Old Timers' Parade, Offering Cash Prizes to the Best or Worst Entries.
- A Style Show.
- A Music Night.
- A State Dealer Convention.
- School Children's Day.

Wherever possible, individual local advertisers were induced to use Automobile Show miniature cuts in their copy. For this generous supplies of mats were supplied to all general advertisers. Every day of the pre-show campaign a mimeographed story was sent to every paper in the state. Naturally not all of them lit, but a big portion of them did, more than paying the expense.

The advertising in the newspapers began ten days before the show. It was copy that carried out the idea of the show and



the press agents will admit that "movie methods" governed the structure of much of the stuff. It was copy designed to get the people and not to sell automobiles. It was well illustrated, the pictures bearing out the story of the artistic setting for the show that the publicity was beginning to carry.

The publicity in the meantime was running through every channel of the paper and was handled by no less than six people. The girl who wrote the art topics on the leading paper was handling that phase of the work and all the columns open to her carried the story of the work. It undoubtedly reached a class that would not have been caught on the regular show stories. Another, writing society notes, got the woman's angle of the show and there appeared story after story of visitors coming to town for the automobile show, of entertaining being done on the score of show visitors. Many of the names were those of the men of the trade and their wives but it gave the show new standing.

The commercial editor was on the trail because of the trade convention idea that had been built into the show and the automobile editors wrote the show stories as in the past.

The many beautiful posters from the national printing houses were rejected and locally created color work that seemed more appropriate to the character of the event soon made its appearance. Thousands of posters and cards appeared in every hotel, store and shop.

### Getting Free Window Display

The free space was further "worked" through the co-operation of the commercial firms of window decorators. These were called in to a luncheon and their co-operation asked for. It was gladly given and the next week every window controlled by these commercial decorators, whether clothes or hardware or any of the trade of the downtown streets, blossomed out as an ad for the show, usually built around the posters and cards furnished by the association. One even went so far as to work into each window one of the impressionistic figures produced by the show decorators. It impressed the public more than ever with the idea that the show was a civic occurrence that one couldn't miss.

The direct advertising was used mostly on the trade, though many of the dealers wrote hundreds of letters direct to their clients and prospects inviting them to the show. The accessory and equipment houses got busy with the outside trade and more than 8000 letters were sent to approximately 1000 dealers and members of the trade. The result was a registered attendance of more than 600 dealers from points as far east as Montana.

The "dealer help" form of advertising consisted of wind-

shield cards, envelope stuffer and handbills emphasizing the special rates granted for the show.

The trade broadsides and mailing pieces featured the show and the trade convention. One had a mailing card attached and proved its worth by the response.

Through the co-operation of local trade magazines and motorist publications, special covers and copy featuring the show were procured.

The speakers' campaign on the show covered every meeting of any importance in the week preceding the show. The best posted men in the trade were put in charge of this campaign, supplied with figures on the size of the business, the commercial value of motor cars and trucks, the importance of motor transportation to Oregon and Washington with their limited railroad mileage and such material, leading up to the coming show.

The accessory jobbers took their salesmen into conference before their departure for the territory and told them to talk show as much as their line. It was on the theory that some real stimulant was needed and if the show idea could only be made big enough it might jar something loose, it might put the skids under the lethargy that resulted from the first withdrawal of ready cash and continued for reasons that were not held sufficient. This and the mail campaign had their effect. More than double the number that registered at any previous show came in from the outside for Portland's 1922 event.

To help Portland get the "big week" idea of the show, the special features were prominently played. A well advertised style show made up of entries from 12 specialty shops drew the biggest night crowd ever seen at a Northwest exhibit. Conducted on a promenade high above the cars, thousands saw it and lingered to talk car. Some local dealers still maintain that such features detract from the main purpose of a show but the majority feel that for the first time the public has got over the old kick about "paying fifty cents to go see a lot of automobiles they want to sell you."

Music night appealed to a different crowd and sales made of the higher priced cars indicated that it brought out buyers. On this evening, a 40-piece concert orchestra was hired at a price that cost half the night's gate. It had played throughout the United States in the best houses and as an advertiseable feature, immediately established the show on the highest plane with the lovers of good music.

All in all it was a big week. It got public attention and stimulated the trade and it is a foregone conclusion that Portland's next automobile show will be still more of a civic event and less of an automobile market, because dollars in the pockets of most of those who took part, shows that the civic event was after all the best market.

—A Show of  
**MUSIC  
LIGHT  
COLOR  
LIFE**



**AUTO SHOW**  
JAN. 23-28  
AUDITORIUM

**Marking a New Point in Motor Car History**

The 1922 Portland Automobile Show is a tribute to America's most indispensable instrument in our social and economic life—the Motor Car.

The first industry to recover from the blow of the "return to normalcy"—the first to stride out to entirely new goals, is that of Motor Car manufacture.

What these new goals mean to you will be disclosed in the year's most favorable opportunity to see all the modern, in all the varied styles, in a rich, resplendent setting that will help you to get the best impression of your favorite.

**MUSIC EVERY NIGHT**  
**SPECIAL FEATURES**  
**EDUCATIONAL EXHIBITS**  
**THREE FLOORS OF MOTOR LURE**  
**EQUIPMENT SHOW IN CONNECTION**

### A New Appeal in Show Advertising

THESE reproductions are typical of the advertising planned by Portland dealers to give their show a new and broader appeal. The exhibit was featured as a field day of motor transportation and a social event, one that the public would profit by intellectually and economically. That the idea went over big was evidenced by the record breaking attendance.



**Motordom's Most Imposing Spectacle**  
**Showing 1922's Finest of American Cars**

THE NEW AUTOMOBILE SHOW NEXT WEEK AT THE AUDITORIUM IS MORE THAN A MOTOR EXHIBIT. It is a pageant of progress depicting the Wonder of the Age—the development of the Automobile. Coupled with this is the fact that:

QUALITY FOR QUALITY. Dollar for Dollar, Cars are cheaper than at any time in the history of Highway Transportation.

Your best opportunity—to find your only one of the year—to compare them all in one comprehensive assembly that includes the finest of American cars of standard make in every price field, is the 1922 PORTLAND AUTO SHOW.

**A Week of Special Events**

MONDAY—Children's day. Admission the usual 50¢ P. M. for all school children under 12.

TUESDAY—Old-Timers' Parade— Noon.

WEDNESDAY—Oregon State day.

THURSDAY NIGHT—Factory night.

FRIDAY—Music day. Orchestral programme. Admission and night.

SATURDAY—Special features.

STODENMEYER BAND EVERY DAY AND NIGHT

**Auditorium—Every Day and Night—Open 9:30 A. M.**



# Functions of the Dealer in Car Distribution

*THE Dealer's Place in the Local Merchandising System Requires that Factory Supervision Be Held to the Minimum — Strong Dealers Can Be Developed Through Individual Responsibility*

By HARRY TIPPER

THE whole distribution system in the marketing of passenger cars hinges upon the retailer. The position of the retailer, his business acumen, his strength, his ability to conduct properly the various departments required in the automotive business and the service he renders, are things upon which the market of the individual manufacturer depends. They are also the limiting point of the total market for automobiles to a very large degree.

The retail distribution of cars has grown with great rapidity and the retailers have come into this business from all kinds of occupations and in all kinds of ways. Most of them have not been in the business five years. They are still adventurers in what is a new line of endeavor for them. They have been able to erect a large volume of business upon a small capital during the era of rising prices and easy markets. Some of them have developed into strong, capable business men handling the largest concerns in their communities. All of them are important in the business life of their various communities and the influence which they exercise in various ways upon the community reacts upon the automotive business from that community.

## *From Many Walks to Dealership*

At the risk of being wearisome, it is necessary to repeat the statements about the short life of the average dealer in the passenger car field today and the diversity of other occupations from the ranks of which these automotive dealers have been drawn. Without this picture, the manufacturer has no ground work upon which to draw the possibilities of future development. In one small town seven car dealers represented these original occupations: One had been a successful plumber, one had been in the real estate business, two had been automobile mechanics, one had been a salesman for cars, one had been set up in the automobile business by his father because he had always been tinkering with cars, and one had been a chauffeur.

This picture can be repeated, not in the actual occupations, but in the diversity in almost any fair sized town in the United States. Implement dealers, old bicycle repair shops, salesmen, automobile owners of various kinds, and a host of others who have entered the business of retailing in this field have expanded, in many cases, with great rapidity, so that they have been obliged to meet unknown problems day after day and with but very slight experience.

Under these conditions, there must exist a wide difference in efficiency, a very great difference in the knowledge possessed and the initiative exercised by these various retailers. These, however, are established concerns. As they drop out, new concerns come in from other lines to take their places, although each year a larger number of those entering the business do so with a previous experience in the same field. The automotive manufacturer must work with these established retailers and his business depends upon their efficiency very largely.

We have stated before that the sale of passenger cars pos-

sesed many differences from the sale of other products. The passenger car is useful entirely for the service which it renders in its daily transportation of people. The efficiency of that service depends very greatly upon the character, the judgment, and the skill of the local retailer. The reputation of the car is involved in that service, in that locality, at all times. At no time can the reputation of the car be divorced from this local condition. Every man who knows the business has scores of illustrations indicating the strength of this reaction upon the reputation of the car from the character of the local service rendered in connection with its use.

## *Locations Convenient to Car Owner*

Regardless of the position held by the individual manufacturer concerning the advantage of distributors for his particular purposes, the only possible method of securing a market for passenger cars requires an efficient and stable line of retail establishments located at convenient points all over the country, so that the user of the vehicles can do his buying and secure his service in his ordinary zone of activity.

The functions of the retailer are:

First—To sell cars within his local area; to obligate himself for a definite number of cars in advance of his sales; and to undertake their distribution in the local zone of his activity.

Second—To keep in stock such items as may be required for the ordinary service of the user of the car and to provide sufficient storage space for cars while they are being served in this manner.

Third—To establish the equipment sufficiently to conduct the ordinary necessities of service and repair expected by the user, and to establish these on a reasonably rapid and fair basis.

Fourth—To maintain the departments of his business so that all the commodities required with the car and for the car can be readily secured by the customer within the reasonable necessities of the locality.

In the course of this rapid growth in the automotive field, the functions involved in retailing and servicing automobiles have not yet arranged themselves in what would be a logical or orderly percentage of development. Because of the lack of efficiency in service in many localities, exclusive repair shops have grown up. There are many exclusive storage places in the larger cities, and there are still car sales establishments unable to give the proper service to the user of the car. Supplies have not been thoroughly considered, and in general, the present situation presents many weaknesses and much confusion. This, however, is only the natural result of the growth and the entry of a large number of people into the business of retailing from so wide a diversity of previous occupational background.

In comparison with other lines of retailing covering the small cities and towns of this country, the retailing of passenger cars, the necessary service and repairs, the proper stocking of supplies, etc., represents a large business and a business involving problems foreign to other lines of retailing;

more severe and requiring a more effective experience to efficiently work them out. In other words, the efficient distribution of passenger cars requires a higher type of retailing merchant than the ordinary work of retailing goods over this country. To arrive at a decent efficiency, therefore, a longer experience is necessary and much more work must be done in the development of this branch of the field.

In the retailing, as in the wholesaling of a product, the efficiency of the business depends very greatly upon the judgment, initiative, and capacity of the individual concern. Methods of stocking, advertising aids, sales manuals, etc., are of little value unless they are backed by the use of considerable judgment and initiative on the part of the individual retailer. There is, in fact, a degree of danger in the control of the retailing system by the manufacturer too closely in detail, because this produces a tendency on the part of the retailer to lean more and more on the centralized system of the manufacturer until his individual efficiency has finally decreased very materially.

### *Efficiency in Retail Establishments*

The wide variation in the standards, in the equipment, and in the efficiency of retail establishments selling passenger cars is a difficulty of very great proportions and a difficulty which cannot be overcome merely by a closer supervision of the retailer from the factor. There should be a very much closer co-operation between the retailer and the factory, more open discussion, and more effective understanding of the problems common to both. The supervision itself should be kept at a minimum at all times because the industry needs stronger dealers, larger numbers of stronger dealers, widely distributed throughout the United States, in order that the future problems may be worked out. Strong men are not created by close supervision. They are developed by larger understanding and the necessity for proper decision upon the larger points at issue. The distribution work, particularly in retailing of passenger cars, is not yet a system. There has been no time to create a system in the few years of widespread distribution of passenger cars. The elements of the future system are here—the development into a system depends very greatly upon what the manufacturer does with it during the next five years. If the retailing of passenger cars is standardized with too much uniformity and too close a supervision from the factory, the sale of passenger cars will be limited by the character of the system itself. If the manufacturers arrange matters with the dealers so that the main problems are understood, and the main interests of passenger car sale and service are covered, and if these matters are followed up with a better type of co-operation and discussion, the distribution, as far as retailing is concerned can be gathered together in the next few years and welded into an actual system out of the diversified elements at present in the field.

### *Greater Knowledge of Retailing Needed*

In general, the retailing of passenger cars requires an improvement in the selling methods, an understanding of turn over in its relation to capital and profit, better acquaintance with financing, more careful cost consideration, in the extension of service and conduct of repairs, a more definite understanding of the local needs in connection with supplies and accessories, a greater understanding of the manufacturer's policy and position, and a development with the manufacturer of thoroughly understood contractual arrangements with reference to the handling of used cars, the cost and character of service, etc.

This is a work which depends upon the growth of a better understanding between the manufacturing and the retailing branches of the industry, and, particularly, between the individual manufacturer and his retail dealers. It calls for a method of square dealing not only, but in addition intensive attempts to develop strong dealers by putting the facilities of the manufacturer's wider experience and information at the service of the dealers for their improvement and development. It is said that there are only 8,000 dealers in the field today, rated at \$10,000 or over. Only a comparatively



small number of dealers, so-called, are strong business houses. The manufacturer requires, however, a much larger number of dealers, than 8,000 for the distribution of cars in this country. The number of worth-while dealers in passenger cars is, however, probably not more than 40 per cent of the total in the field.

It is the business of the manufacturer to see that his own sales possibilities are limited very strictly in accordance with the efficiency, the ability, and, to some extent, the number of his outlets. It is his important interest to see that the dealers are given the opportunity and encouraged to reach higher standards of efficiency so that the business may be stabilized all through, the markets thoroughly canvassed, the local influence of a character that will breed confidence, and the whole atmosphere surrounding the distribution of cars one of development.

### *Manufacturers Should Encourage Associations*

In the face of the present confusion, the problems of the manufacturer in connection with his distribution may lead to errors of development just as easily from a desire of speedy solution as they may lead to a lack of development from the tendency to avoid facing the entire issue.

One of the steps the manufacturers could take would be to encourage strong associations of dealers all over the country with their national affiliations through the present National Automobile Dealers' Assn. or some similar body, and with well defined programs of education through their own memberships for the stabilizing of the business. Followed up by the work of the individual manufacturer with his individual dealers, these developments would have a very great effect upon present problems and be of great service in clearing up the present confusion and in clarifying the situation generally.



## New Models, New Engines, New Equipment

### Marmon Making Four-Passenger Speedster

COMFORT, speed and dependability are among the chief qualities of the new four-passenger speedster just introduced by Nordyke & Marmon Company.

The appearance of length and lowness is based on actual figures as well as impressions. The over-all length is 186 in., a figure larger than that of any other model, not even excepting the seven-passenger touring and closed cars. The height is 73 in., materially lower than that of any other of the Marmon line except the two-passenger speedster.

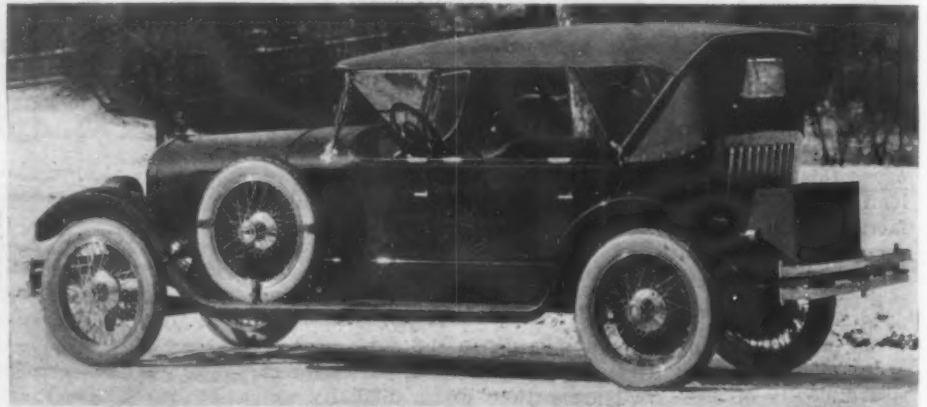
Finished in dust-proof gray and upholstered in gray Spanish leather or in coach blue and black enamel leather, the exterior and interior appearance of the car appeals.

Equipment differing from that of the usual open car includes a trunk rack with trunk and cover mounted on the rear. The spare wheel is mounted in a saddle sunk in the left-hand running board.

Other specifications include top bows of natural wood with nickel-plated mountings, nickel-plated gear shift lever and steering column.

A compartment in the rear makes a convenient place to carry small packages as well as the curtains and other equipment.

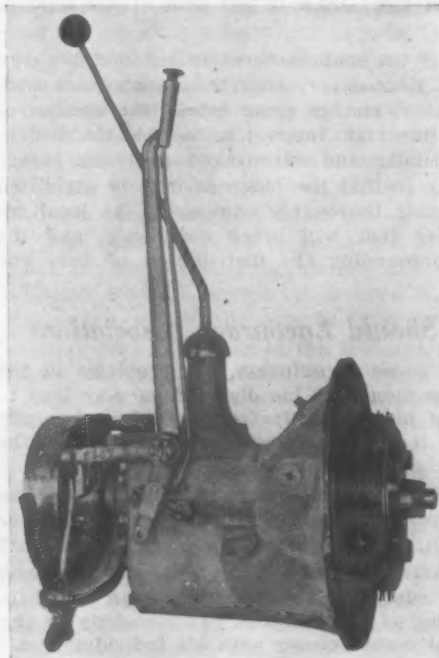
The price of the four-passenger speedster f.o.b. Indianapolis is \$3950.



New Marmon speedster which has unusual carrying space. The car has many nickel trimmings and the trunk is regular equipment



The Tuarc wheels, deluxe Boyce motometer, windshield wings, bumpers and special paint job on this new super-sport model Oldsmobile are standard equipment



Fuller gearset, showing method of mounting brake. Oil-filler hole denotes correct height of lubricant

### Fuller Gearset for Medium Sized Cars

TWO new passenger car transmission gearsets for medium size cars and for larger cars have been brought out by Fuller & Sons Mfg. Co. Both have three speeds forward and one reverse.

One of the features is the short heavy construction of the mainshaft and countershaft. This is designed to relieve the two shafts of any possibility of springing apart where there is a heavy pressure on the gear teeth and to give longer wear for the gears, less vibration, and a quieter transmission. Provision is made on both models for attaching a tire pump. A transmission brake bracket may be attached to the rear of the transmission to accommodate Norwalk or similar transmission brakes.

Another convenience is the oil level filling hole. When the oil is poured into the top of the filler hole the oil level in the transmission is correct. The clutch throwout bearing is lubricated automatically by the gearset oil.

The countershaft of the model F for medium size cars has different construc-

tion than heretofore used in Fuller transmissions. The countershaft gears are cut in one piece. These gears revolve on a stationary countershaft with Hyatt roller bearings. The inside of the gears and the countershafts after hardening are ground true to assure gears revolving on true centers, for quietness and life.

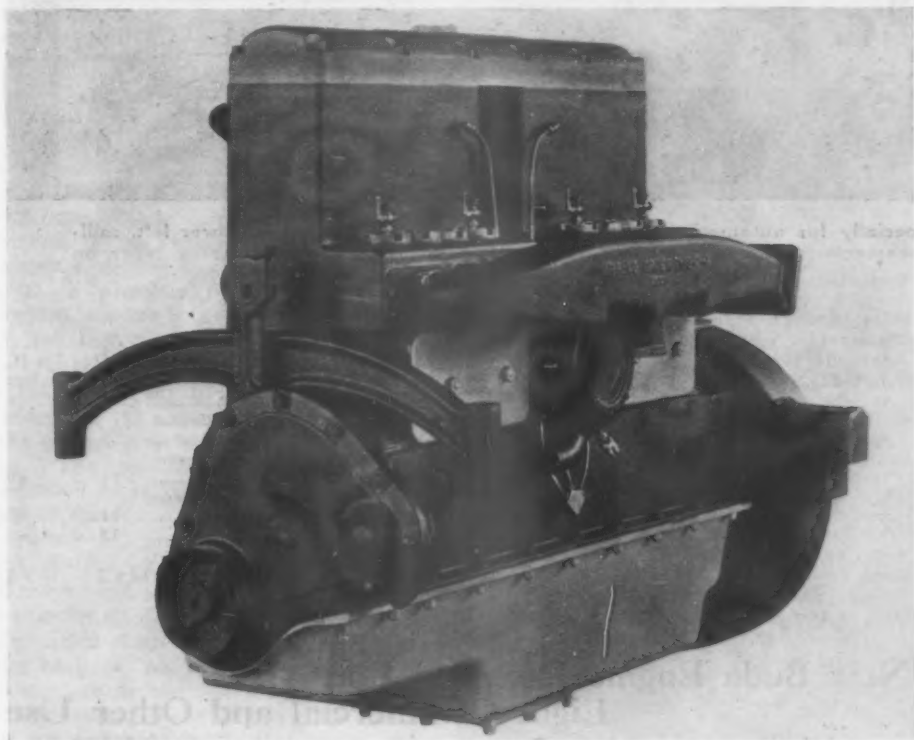
Model TU-5 transmission is for six-cylinder engines up to 400 cu. in. piston displacement. The clutches in both models are the standard Fuller multiple disk construction which is standard equipment on a number of makes. The drive is through hardened steel pins to hardened saw steel disks faced with asbestos fabric facings. The driven disks are also hardened saw steel to hardened steel pins ground for true rotation.

New Model F Fuller transmission gearset designed especially for use in medium sized passenger cars. The plug in the side is for oil filling and determines the correct height of lubricant.

## Oldsmobile Sport Model

A NEW body known as the model 47 super-sport car with a number of items as additional equipment which are standard on this model, has been put out by the Olds Motor Works. The car is upholstered and completely trimmed in maroon leather. It is painted jersey brown. The car is equipped with Tuar disk wheels, individual cast aluminum bracket type steps with molded rubber tread and individual bicycle type fenders

with splash aprons. In addition, the following features are standard equipment: Gabriel snubbers on rear, triple bar steel bumpers, Boyce deluxe motor-meter mounted on a bar type of radiator cap, windshield cleaner, cigar lighter, double plate-glass windshield wing, stop signal, cowl ventilator, spot-light mounted on left front fender apron, step light for both rear doors and a bevel glass, rear-view mirror. There is a leather top boot and a carrier for two extra tires. This car, complete, as described, is priced at \$1825.



The Jackson kerosene burning engine. The valves are at the side and each cylinder is fitted with two pistons. Accessibility is one of its features

## Jackson Engine Designed for Burning Kerosene

A KEROSENE burning engine with a two-piston-per-cylinder construction and which otherwise differs materially from conventional practice has been put into production by the Petroleum Motors Corp., Rockford, Ill. The engine is designed especially for trucks of three to four tons capacity.

The engine operates on the four-cycle principle and has two pistons and two connecting rods per cylinder.

The top pistons are placed with the heads toward the head of the bottom pistons. The bottom pistons in cylinders 1 and 2 work in unison with the pistons in the top of these cylinders. The rods of the upper pistons are necessarily longer than the others and are placed 90 deg. from them on the crankshaft. The top and bottom pistons do not, therefore, travel at the same rate of speed. Pistons in cylinders 3 and 4 also operate together.

There are four cylinders, cast in pairs, each pair being identical and interchangeable. The bore is 4 1/4 in. The

piston displacement is 369.7 cu. in. and the S.A.E. rating 28.9 hp.

With the two piston construction each of which has a different speed, a high state of turbulence is created during the compression cycle and it is claimed, therefore, that the whole volume of charge is at the same temperature at the time of ignition. Each time the pistons travel towards each other the action might be likened to two heat waves coming together to compress the fresh charge. Owing to the absence of a water jacket at the top of the engine as in the conventional type of engine no heat is imparted.

On the contrary, the upper piston is as hot as the lower piston at all times and as mentioned before makes possible the same temperature over the whole volume of charge. Water is, of course, maintained around the cylinders. Each cylinder is completely surrounded by the water jacket. The peculiar layout of the pistons and cylinder is said to aid in keeping the walls of the combustion chamber and spark plugs at a lower av-

erage temperature, eliminating local hot spots as well as producing a more homogeneous mixture. The firing order, 1-3-2-4, unusual for a four-cylinder, is such that no two adjacent cylinders receive heat consecutively.

The combustion chamber is spherical at the time of explosion. On the intake stroke the pistons recede from each other and thereby produce a high vacuum in the cylinder. The gas enters and is compressed by the lower piston ascending and the upper piston descending. The two come together practically at the same time excepting for the 90 deg. difference in the crank throws.

This compresses the gas very rapidly. With the lower piston at its highest point and the upper piston 90 deg. from its lowest point the gas is exploded. Thereupon the lower piston descends while the upper piston ascends for a period of 90 deg. crank travel. When the upper piston starts on its down stroke the rate of travel is comparatively slow because at this point it is at its dead center. The lower piston at this moment is travelling at its highest rate and exerting its greatest effort on the crankshaft. The port leading to the exhaust valve is uncovered by the lower piston. The spark plug is very long so that the spark occurs close to the center of the spherical combustion chamber.

Outwardly the engine resembles conventional designs.

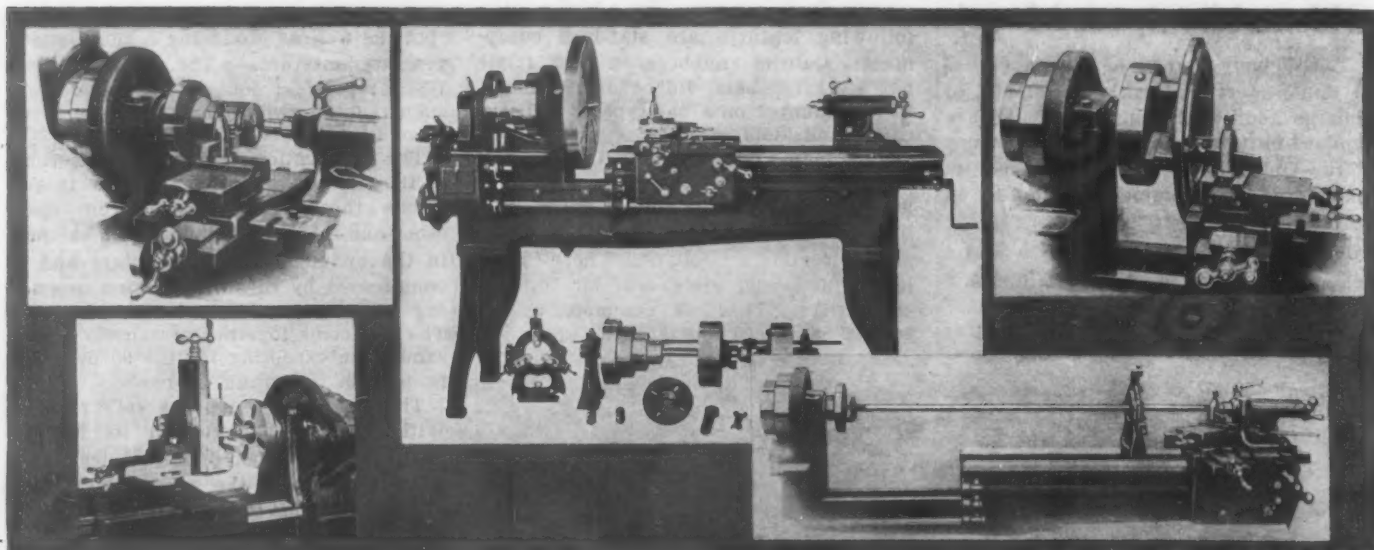
Conventional type of poppet valves are placed at the side of the engine and these are operated by mushroom type of tappets. The camshaft is driven by gears in the usual manner. The design of the engine makes the valves very accessible.

The upper pistons are easy to get at. It is not necessary to remove twenty or thirty bolts to take off a heavy water jacketed cylinder head, nor is there danger of spoiling a gasket or draining the water from the cooling system. It merely is necessary to remove the light aluminum cover and take out the wrist pins and pistons. This operation can be done in five minutes.



The water pump and magneto can be removed as a unit from the Jackson engine





Details of the Barnes lathe, made especially for automotive shops. Upper left, turning a piston. Lower left, milling a key seat. Center, lathe and attachments. Upper right, machining a flywheel. Lower right, turning taper on drive shaft

## Barnes Sliding Extension Gap Lathe

BY MEANS of the sliding extension gap feature of this lathe, a variety of operations usually encountered in the automotive repair shop can be handled. With the addition of the milling attachment which the company is prepared to furnish the lathe becomes a universal machine for cylinder reboring and milling jobs, as well as for all ordinary lathe work. Usually it is impossible to apply the reboring attachment to the standard 14 or 15 in. lathe because the cylinder block generally requires the extension gap.

The sliding extension gap makes it possible to take between the centers a long propeller, while turning a taper on the end for the pinion. Likewise it is possible to swing a flywheel in a chuck from the headstock because of the gap. Practically all classes of piston work can be handled as well as work on crankshafts. The milling attachment takes care of such operations as squaring the ends of shafts, sawing a shaft, splitting a bushing and milling a key-seat for a Woodruff key.

The price of the lathe, with a 5½ ft. bed but without cylinder boring attachment, milling attachment, etc., is \$700, while the price with a 7½ ft. bed is \$750. A self-contained motor drive for the lathe makes possible convenient installation for service shops and isolated places where there is no line shafting, but where electric current is available. The motor drive, without motor costs \$100. The lathe is made by the Barnes Drill Co., Rockford, Ill. Following are the specifications:

Swing over bed.....	Inches
Swing over carriage.....	14½
Swings through gap.....	10
Cone diameters.....	24
Width of steps on cone.....	10, 3, 6 and 4
Width of top bed over all.....	2½
	11½

Hole through spindle.....	1-9/16	1½ in. tool.
Diameter of spindle nose (4 threads per inch).....	2½	Lengths of bed regularly furnished.....
Front bearing of headstock spindle.....	2-15/16x3-7/16	5½ ft. 7½ ft.
Back bearing of headstock spindle.....	2¼x2½	Inches Inches
Diameter of tail stock spindle.....	1-13/16	Center Rest takes in.....
Head spindle has Morse taper No. 5 and is fitted with No. 4 Sleeve.		Angular travel of compound rest.....
Ratio of back gearing.....	11 to 1	Lathe takes between centers, closed.....
Feed screw 1 in. diameter, Acme Standard.		Lathe takes between centers, extended.....
Slot in tool post takes ½ x		Lathe gap opens.....
		Size of friction pulleys on countershaft.....
		Speed of countershaft, 200 revolutions per minute.

## New Buda Engine Designed For Light Commercial and Other Use

THE Buda Co. has added a smaller model engine to its line. It is a heavy-duty, high speed type designed for light commercial or other use where a four-cylinder, 3½ by 5½ in. engine would be practicable.

The engine is designed for three-point suspension with the rear supporting arm cast integrally with the upper half of the crankcase and arranged with main frame supports. The forward end of the engine is supported at the crank center by a trunnion bracket arranged to rest upon a drop cross-member of the frame.

The cylinder block is provided with large water jacket space baffled so the water is discharged directly beneath the valves and designed to secure circulation around each valve. The spark plugs are located in the cylinder head, the threaded part of the spark plug in contact with the water head being entirely surrounded by water. The water outlet on the cylinder head is fitted with a removable elbow which may be placed in four different positions. In fact, the entire engine has been laid out to be as universal as possible in its installation.

One of the features which may be mentioned from an accessibility standpoint is that the cylinder head is provided with a ledge projecting beyond the

block, which makes it possible to remove the head without damaging the gasket, and, at the same time, with a saving of considerable time. Lugs on each end of the cylinder and head are provided for breaking the joint in removing.

The gray iron pistons are fitted with concentric rings above the wrist pin and one wiper ring in the lower part of the skirt. To prevent the piston pin from working through against the cylinder barrel there are two locks on the piston pin, one being an alloy steel lock screw with two diameters and extending through both sides of the pin to give double shear and prevent improper fitting of the pin at any time. The second is a spring retainer ring which expands in grooves turned in each end of the piston bosses.

The working surface of the cams on the camshaft and the three camshaft bearings are given a ground finish. The valves are driven through mushroom type pushrods, fitted with removable guides. The pushrods are made large to permit the use of large diameter adjusting screws, as well as to maintain correct alignment. The heads of the adjusting screws are fitted with oil-hardened steel blocks to facilitate alignment and eliminate warpage caused by case

hardening. The large bearing area at this point also permits of low unit pressure at the adjustment and consequently minimizes wear. To facilitate removal and permit adjustment of the valve tappets, the cover is split into two sections.

Pump water circulation is used, the centrifugal pump having a bronze runner and large packing glands. Bronze sleeves are fitted over the pump shaft to prevent rusting and pitting and the pump is made up as one assembly unit so that the water pump and its drive-shaft may be removed as a unit or separately. The engine can also be arranged to take the thermo-syphon system.

Full pressure feed lubrication provides oil for the crankshaft, camshaft bearings and connecting rod bearings. Oil is forced to the main bearings and camshaft bearings through a seamless steel distributing type which is cast in the crankcase. Oil is forced from the main bearings to the connecting rod bearings through a drilled passage in the crankshaft. A pressure regulating valve is provided, the oil being pumped from the oil reservoir, which is located beneath the crankcase, by a geared pump located in the center of the oil reservoir and attached to the upper half of the crankcase to make it independent of the oil pan. The pistons and cylinders are lubricated by oil thrown from the lower ends of the connecting rods. The timing gears are fed positively from the pressure system. The extra wiper ring on the lower end of the piston is designed to prevent an excess of oil reaching the combustion chamber and a double throw ring back of the rear main bearing is designed to prevent oil leakage into the bell housing. There is a settling chamber for sediment in the bottom of the reservoir below the oil pump, from whence it may be drawn off from time to time.

All of the accessories are accessibly arranged and may be readily detached. The engine complete weighs 646 lb. with flywheel.

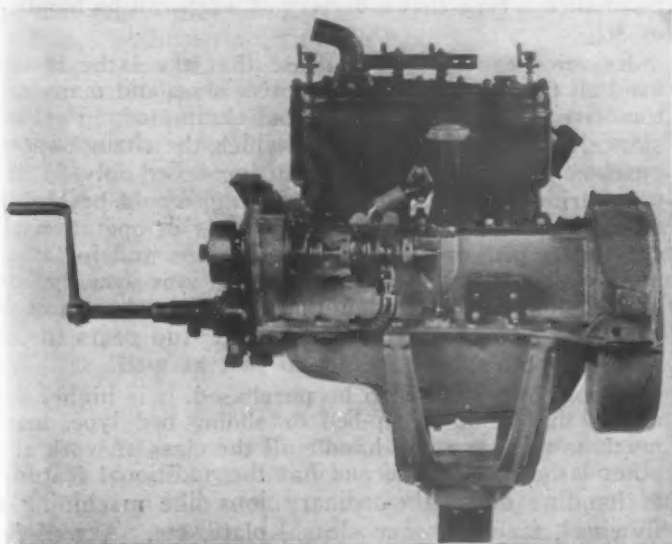


### Wills Sainte Claire Imperial Sedan and Town Car

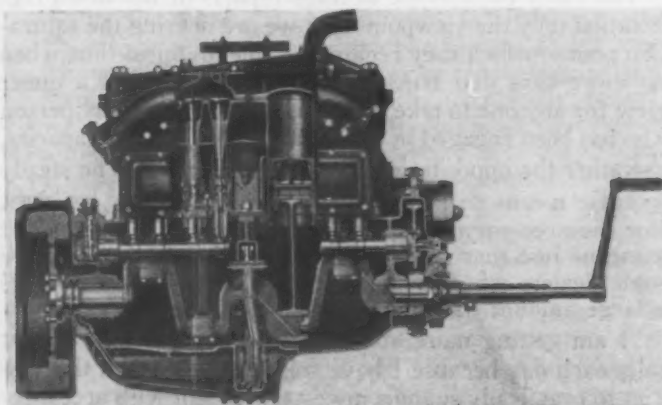
**T**HE Wills Sainte Claire Imperial sedan is a cross between the conventional limousine and the usual sedan design. A glass partition which can be raised or lowered at will divides the in-

terior into a front and rear compartment. When the owner is driving, the partition is lowered.

The limousine and the town car have the same dimensions as the sedan, except that the distance from the front of the back seat to the back of the front seat is 48 in. and the distance from the front of the front seat to the dash is 24 in.



Left side of the Buda engine. Note the oil filler opening on the top of the cylinder block and also the accessible location of pump. The engine is three-point suspended when in a chassis.



Sectional view of Buda engine. The lugs at the ends of the cylinder block and head will be noted. These are for ready removal of the head without danger to the gasket.



# MOTOR AGE

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## Our Enlarging Field

THERE are in round numbers 10,500,000 motor cars and trucks in this country. That figure was made known from the registration of cars and trucks during the year 1921. We have all read in the news reports that factories are speeding up production this year because there is a buying demand and so there will be another increase next year.

Too many persons see in these reports of increased registration only the viewpoint that we are nearing the saturation point—which they regard as some mythical time when no more cars and trucks can be sold. That is a queer view for any one to take, most of all a dealer or any person who has been engaged in this great industry in any capacity.

Rather the opposite view is the one to take. The steady increase means that much more opportunity for business. For the accessory or equipment manufacturer and dealer it means just that much bigger field for sales. There are some dealers who visualize this. A car dealer who sells a large amount of equipment said the other day:

"I am getting more and more independent of new car sales each day because I have sold enough cars in this district to practically support my establishment with accessory sales and maintenance work. But that does not mean that I am letting up. I see much more in the sale of a

car than the profit the deal represents. My car customers keep their cars on an average of four years. That means to me that each time I sell a new car I have made a direct connection with a man who is to be a steady customer of my establishment for four years. I sell 90 per cent of the tires that the owners of my cars use and I believe that I get about that per cent of all motor car money they spend except that for oil and gasoline."

This man has a large view of his business prospects. He is working on his list of car owners constantly. He keeps in personal touch with them. His next remark also was interesting:

"A used car sale to me means tying up a prospect for one of my new cars. I endeavor to interest the buyer of a used car in my establishment and to sell our establishment to him so thoroughly that he will believe that this car, if it is some other car than the one we sell regularly, performs well it is because it is taken care of by our establishment."

This man takes the big view of the increasing number of his cars in use, just as every dealer in automotive goods should view the registration in general and particularly in the case of the cars or trucks in which he is especially interested.

This is just as true of the car dealer and manufacturer as in any other branch of the business. Every new car registered and in use, means that another man—or more likely a family—has been thoroughly sold on the motor car or that a business has been sold on the motor truck. Mighty few persons ever give up the car or truck. Rather than give up the vehicle, the owner becomes a better business man or a more earnest wage earner in order to assure himself that he will not have to give up the vehicle. Also he is educating his children to the motor car or truck standard so that they will put forth their best efforts to come into that financial class which will enable them to own a vehicle. It is a work that keeps on spreading and the end is not yet beginning to be in sight. It is bringing about business and social change that appear to be abundantly able to support a continued increase.



## The Lathe for the Automobile Shop

ANY lathe for the automotive repair shop in order to be thoroughly practical and with the assurance that it ultimately will pay for itself, should be of such a type that a variety of work can be handled on it.

Experience seems to indicate that the lathe is not used all the time in the automotive shop and many automotive features can well be eliminated. For instance, a back geared lathe in which the change speed gearbox is provided with a shifting lever only to obtain various speeds for screw cutting, would be highly essential in a shop where the lathe is in operation all the time. However, for occasional jobs and for automotive repair work where no two jobs usually are alike from one day to another, a lathe wherein it is necessary to remove the driving and stud gears to obtain different speeds would do just as well.

If only one lathe is to be purchased, it is highly desirable that it be a gap-bed or sliding bed type, inasmuch as this type will handle all the class of work any other lathe will handle and has the additional features of handling out-of-the-ordinary jobs like machining a flywheel, facing a cone clutch, plate, etc. A well-designed gap-bed lathe will not be appreciably weaker than the straight bed type.

The lathe when fitted with such auxiliaries as a tool post grinder and milling attachment makes it possible for the shop to handle almost any kind of work, such as cutting keyways in shafts, milling the ends of tapered shafts for Woodruff keys, etc. Shops doing electrical work will find the lathe useful for truing up starting motor and generator commutators, roller tracks in timers, etc.

In order to make the lathe as useful as possible it is desired that the tail stock be cut away to permit of the compound rest to be swung around to an angle of 90 degrees. The tail stock should, of course, be adjustable for taper turning.

To handle all classes of work the garage or service station lathe should be equipped with a large and small face plate, follower rest, compound rest, centers, four jaw independent chuck, a drill chuck, set of dogs, turning and boring tools and wrenches.

Many thousands of cars no longer in production are in use, especially in the rural sections of the country, and it daily is becoming more and more difficult to get parts for these cars. The shop, large or small, which possesses a lathe is in position to make these parts and thus holds a distinct advantage over a shop not so equipped. More and more farm tractors and trucks are coming into use and if a farmer is forced to do without his tractor or truck at certain times of the year pending the arrival of new parts, it may mean serious loss. A lathe in a shop at such times reduces the time lost to a few hours, instead of days.



### Paying for a First Class Job

**W**E FEEL quite certain that motor car service is getting better as time goes on. The service station and repair shop is becoming a real factor in many communities and is looked upon as a legitimate business proposition. Still there are many instances of where a shop falls down miserably on a job. Probably in the majority of cases such instances come about without the full knowledge of the man in charge, but at any rate they show the need for thorough inspection of every important job by a competent foreman or inspector.

The other day a car owner complained to us of such a job. He had had the rear axle of his car repaired. It was noisy after the service station turned it over to him. So finally with the assistance of a friend he took down the axle. The bearings were loose in their mountings and the service station mechanic had taken a center punch and made a series of burrs on the outer race surface to take up the play. Certainly a botch job. The job had been turned over to the man as being first class work, but was it?

It is that sort of practice which has turned many a car owner from the service station. A rigid system of inspection would have prevented it. The car owner was willing to pay for a first class job, but he didn't get it.



### Look Pleasant, Please

**S**OME men carry about with them a grouch that becomes so real to them that they cannot see a bright ray even in their own business when it is brought to their attention. The writer was talking with an automotive dealer a few days ago who has an undying hatred of one organization in this business. Most of that conver-

sation was about this particular company. In fact, it was rather difficult to get this man to talk about the good points of the vehicles that he sold.

This man, or any other man who permits a grouch to occupy most of his mental and vocal effort, cannot be true to himself nor make the most of his possibilities. A man should believe in his own business and its possibilities and he should talk of these in order to get other people to believe in him and his cause. No man ever got big by tearing down other business. The tearing down process is a natural result that is likely to take place if the man having the opposition believes in himself and his product firmly enough, and if he and his product are worth the belief.

The prospects are very good for spring business and this is not the time to nurse a grouch. If each of us is going to get the very best out of the spring trade, each of us must boost our own business, not worry about the other fellow. If we boost our own particular part of the industry, we actually will get to believe in the entire industry in the near future.



### Sam Miles on Salesmanship

**I**N this issue you will find some comment on the Chicago show by Sam Miles, the veteran manager of National Shows. Mr. Miles originated the National Show idea and has probably been the closest student of these annual exhibitions. He also has been a close student of the problems of the automotive dealer and his heart is entirely wrapped up in the success of the industry.

So the remarks that Mr. Miles may make concerning the sales effort in the Chicago show are not a mere passing impression of a man who looks in on the industry for a moment. It is the comment of a man who has watched this industry grow from a small adventure to an amazing industry and his thought is to bring home to the manufacturer and dealer the problem that confronts them.

Selling of automotive vehicles is the problem of today. This must be accomplished by the salesmen who represent the factories and the dealers with the customers. Mr. Miles suggests in his comment that these men get to work. Some of the salesmen, of course, do work and they automatically are handsomely paid for their efforts, but it would appear to be better if some of the present salesmen were fired and the cars were permitted to sell themselves, rather than have the handicap of the representation that some of them had at the Chicago show.



### N. A. D. A. Progress

**I**NFORMAL accounts of what has been happening in the National Automobile Dealers' Association efforts to line up a membership on the "One of a Thousand" program are highly encouraging. These informal advices indicate that in practically every city where this program has been explained, twice as many applications have been filed as were necessary from that community to make the "one thousand."

It will take a considerable period for this program to be explained to dealers throughout the country, as it is the sort of a program that requires a personal presentation rather than the printed word. In the meantime a large number of highly reputable dealers are making their personal applications and obtaining the endorsements for their selection for a membership. In doing so, these dealers find that their indorsers, as a rule, need only some such a request to get them active in seeking a membership.



# Starr Makes Bow In Washington

## Specifications of Starr, New \$348 Ford Competitor

**Durant Unveils Vehicle In Washington and Takes Orders for June 15 Delivery**

WASHINGTON, D. C., March 10—The Starr car, to be manufactured by Durant Motors, Inc., to sell for \$348, made its first public appearance here today when it was shown in the sales rooms of Harper Brothers, local Durant dealers. This new car, which for the present will be turned out from the Long Island plant, of Durant Motors, is promised to be in production by June 1. The distribution, sales and servicing of the Starr will be in the hands of Starr Motor Car Co., an independent company.

The Starr car resembles the Durant Four in many details. This might be expected as both cars were designed in a large part by the same engineers. Although the component parts are produced by various parts makers they have in nearly every instance been especially designed for use in the Starr. The piston displacement of the engine is somewhat less than that of the Ford, but the wheel base of the new car is two in. longer, being 102 in.

The engine is a Continental, of the L-head type with cylinders and crank case cast in block. The lower half of the crank case is pressed steel and the cylinder head is detachable. The engine is said to develop a maximum of 35 hp. at 2500 r. p. m. The bore is 3½ in. and the stroke 4¼ in., giving a rated horse power of 15.63, as compared with 22.5 for the Ford.

The camshaft and the combined generating and ignition units are chain driven. The cooling water, circulating pump is driven off an extension of the

generator shaft. The chain is arranged in a triangular layout and is enclosed by a sheet metal cover. The inlet and exhaust manifold are cast with one common wall which acts as a hot spot. A Tillotson carburetor is used and it is fed by a Stewart-Warner vacuum system from the main tank located at the rear. A hot-air stove with short pipe connecting with the carburetor inlet is also provided.

The generator and ignition unit are located on the right side of the engine just back of the chain case. The cutout is located on the side of the generator and the coil is mounted on top of it. The distributor is located at the rear of the generator and comes at about the center of the engine, which permits the use of short, high-tension cables. The flywheel is toothed but the starting motor is not included as standard equipment.

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## INDUSTRY INCREASES FORCE

Detroit, March 10—Substantial evidence of steadily increasing production in the automotive field is found in the employment reports of the 79 firms which are members of the Employers' Assn. The statistics for the first eight weeks of 1922 follow:

Week Ending	Number Employed	Net Change
January 2	60,981	Inc. 8,795
" 10	102,485	41,534
" 17	109,703	7,218
" 24	111,615	1,912
" 31	113,099	1,484
February 7	115,092	1,993
" 14	118,647	3,549
" 21	121,048	2,407

## MACK WOULD BE MACK

New York, March 13—The International Motor Truck Co. has called a special meeting of its stockholders for March 22 to vote on changing the name of the company to Mack Trucks, Inc. The annual meeting will be held the same day.

## Unusual Efforts Move Used Cars For Cleveland Dealers

**All Vehicles Placed In Best Possible Shape and Given Special Sales Rooms**

CLEVELAND, March 13—Cleveland retail automobile dealers never have put so much energy, so strong merchandising efforts and so much time on the sale of used cars as they have this year.

They are operating on the theory, according to several, that the used car will be a problem as it is not handled like any other ordinary business. They are a unit in agreeing that if it is handled in the same manner that a grocer handles his business, or a new car dealer handles his business, there will be no used car business.

Two of the most important steps that have been taken by dealers to dispose of their used cars has been the elimination in nearly every instance of sales on "the as is basis," and the taking of steps to put the used car business on a higher plane. The second accomplishment was brought about by the opening of sales rooms in different buildings than those in which the new cars were handled for the disposal of used cars.

The successful and big money making dealers are just as careful to see that the sold used car is in as just as good condition as it is humanly possible to make it before it leaves the salesroom. No more pains are taken in this respect with the new cars that are sold.

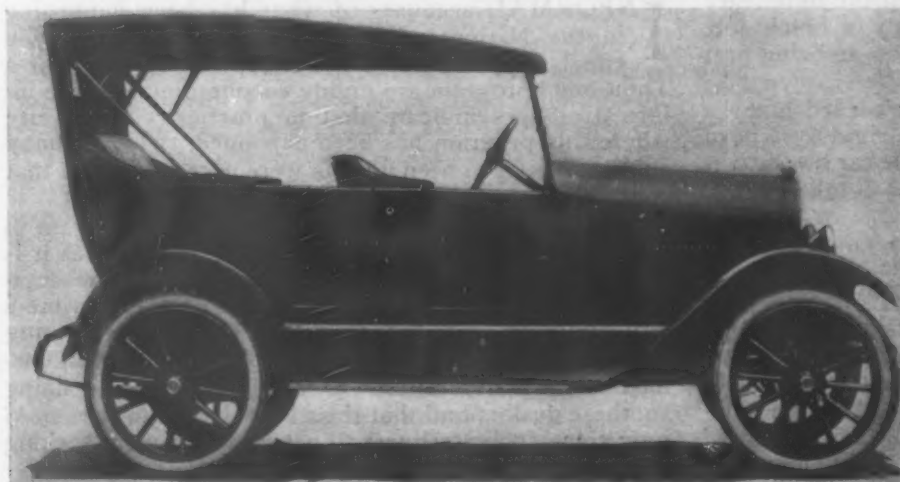
The advertising campaign for sales of used cars was never carried on to such an extent as it is this year. Here are some samples:

The Stuyvesant Motor Co., Hudson-Essex distributors, says in its ads: "You can learn from our permanent book records every new part that has gone into and every lick of work which has been expended on any used car in our tremendous stock—no guess work when you buy a used car from Stuyvesant."

## FIRESTONE ESSAY CONTEST

Washington, March 13.—For the third consecutive year a four-year university scholarship is being offered high school students by the Highway and Highway Transport Education Committee. The scholarship, which is being given by Harvey S. Firestone for the best essay written on the subject, "How Good Roads Are Developing My Community," is an award to encourage the study of highway economies. The essays must not exceed 700 words in length, they must be submitted not later than May 1 and all students of high school grade are eligible to compete.

## New Starr to Sell for \$348



# March Schedules Are Increased

## California State Convention

### Refuses to Act as Salesman

### Denies Use of Headquarters as Sample Room—Endorses Control of Headlight Adjustments

SAN JOSE, Cal., March 11.—Two important steps were taken by the northern division of the California Automobile Trade Assn., which held its annual convention here. The more important of these was the unanimous decision that the association would not give its endorsement to any commodity offered for sale. The decision was made when a communication from the Orange County Automobile Trade Assn. was read, suggesting that samples of a certain demountable rim be kept in the office of the secretary of the association, and attention directed to it, such action on the part of the secretary resulting in the payment of a certain percentage on the sales of the rim to the association, thus assisting in the defraying of the expenses.

Robert W. Martland, secretary-treasurer of the state association, read the reply which refuses to allow the association to be used as a salesman or agent, or its rooms to be used as display rooms for such merchandise. This letter was approved.

### Headlight Adjustment Important Step

The other important step was in regard to the adjustment of automobile headlights, which the California Automobile Trade Assn. is going to endeavor to control through headlight-adjusting stations throughout the state.

Martland explained the plan in detail. Certificates are to be issued by all official headlight-adjusting stations, and will bear the wheel-and-radiator seal of the California Automobile Trade Assn. On the back of the certificate will be a note to the motorist from the California State Motor Vehicle Department to the effect that the department recognizes such certificates as evidence that the headlights on that car have been properly adjusted at the date mentioned, to comply with all legal requirements. Official adjusting stations will be carefully selected, and the men who do the actual work of adjustment will be educated and trained as illuminating engineers before being allowed to make the adjustments.

The stations are to be located in the cities, towns and along every main-traveled highway. The certificates, of course, will furnish no protection from arrest, but as each arrest will be endorsed upon them, and as the motorist who has no certificate will be considered as having failed to have his lights adjusted to comply with the law, it is believed that the

result will be much better illumination, and greater safety in night driving.

About 100 members of the division were present when George Haberfelde, of Bakersfield, president of the association, took the chair. Many telegrams were read from members who could not attend, the most prevalent reason being an improvement in business which pre-

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## McGregor Funeral Closes Ford Plants for One Day

Detroit, March 15.—Plants of the Ford Motor Co. both in Detroit and Windsor were closed Tuesday when the funeral of Gordon M. McGregor, president of the Ford Company of Canada was held. Mr. McGregor died Saturday, aged forty-nine, having served for almost twenty years as president of the company which he organized in 1903. That year Mr. McGregor succeeded his father as president of the Walkerville Wagon Works.

No time has yet been set for the directors to act upon the successor of Mr. McGregor. Wallace Campbell, secretary, assistant treasurer and assistant general manager, is looked upon as the most likely successor.

### PLAN CHRYSLER SIX

Toledo, March 11.—Frank Kennison, one of the receivers for the Willys Corp., has been informed that Clement Studebaker, Jr., Rollin H. White, president of the Cleveland Tractor Co., and Fred Zeder, former chief engineer of the Studebaker Corp., who designed the Chrysler six, are working out a plan to finance the purchase from the Willys Corp. of the rights to manufacture the Chrysler six and have taken some preliminary steps in this direction. It is reported that if they are successful in their efforts the car will be produced at the plant of the tractor company in Cleveland.

### HAYES WHEEL EXTENDS SERVICE

Jackson, Mich., March 13.—The Hayes Wheel Co. has greatly extended its replacement service on wire wheels. Formerly this service was extended only on Ford wheels. A revised catalogue just issued for the trade describes replacement parts for Ford, Chevrolet, Nash, Earl, Durant and Dodge cars. The catalogue illustrates and prices complete wheels and all parts and special section is devoted to rims.

### COLUMBIA MOTORS ORDERS

Detroit, Mich., March 13.—Columbia Motors Co. has orders on hand for 4000 new light-six cars for delivery before July 1, members of the Detroit Stock Exchange were told yesterday at a special meeting staged by advertising counsel of the company.

## Month's Production Gain

### Is Placed at 40 Per Cent

### Sharp Upturn in Retail Sales Features Early Spring Market Conditions Nationally

NEW YORK, March 14.—Production of passenger cars and trucks for February showed a material increase over January. This gain probably was as large as that of January over December which was about 40 per cent, exclusive of Ford. Output was very much larger than in February, 1921.

Highly optimistic reports in regard to the volume of orders received continue to come from Detroit. They are accompanied by announcement of increased production. Several companies, including Dodge, with 600 a day, Maxwell with 200 a day, Studebaker 400, Cadillac 100, and Hupmobile are approaching a maximum production. Ford is speeding up his output both at the Ford and Lincoln plants. Chevrolet has fixed a schedule which calls for an output of 50,000 by July. The Rickenbacker is going into quantity production and the output of Durant Fours is being speeded up as rapidly as possible. Other companies which are increasing their schedules are Reo, Paige, Dort, Columbia, Liberty and Wills.

Employment in Detroit has shown a steady and really remarkable increase week by week since the close of the inventory period after Jan. 1. Employment in automotive plants is slowly but steadily increasing in all parts of the country.

There has been a sharp upward turn in sales at retail, both cars and trucks, in all sections. As a consequence, dealers

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### CHICAGO TRADES ELECTION

Chicago, March 14.—At the annual meeting of the Chicago Automobile Trade Assn. held last night at the Congress hotel, the following officers were elected: President, Thomas J. Hay; vice president, Dayton Keith; secretary, James Levy; treasurer, W. J. Boone; directors, O. G. Heffinger, C. W. Stiger, and Clarence E. Eldridge. Jay A. Colvin and E. J. Kilborn are hold-over directors from last year.

### JANUARY BANNER HUPP MONTH

Detroit, March 13.—President Hastings of the Hupp Motor Corp. announces that shipments in January were the largest for any January in the history of the company. He reports that four times as many cars were shipped in January last as in January, 1921, twice as many as in January, 1918 or 1916, and three times as many as in January, 1919.



## Specifications of Starr, New \$348 Ford Competitor

### Durant Unveils Vehicle in Washington and Takes Orders for June 15 Delivery

(Continued from page 26)

Oiling is by combination splash and pressure. The oil is fed under pressure through the hollow crankshaft to the main bearings. The fan is belt driven from the crankshaft. Both manifolds are located on the left side of the engine. The engine has four-point suspension.

The clutch is of the single plate type and is virtually the same as the one used in the Durant Four. The gearset, mounted amidships, provides three speeds forward and reverse. The rear axle is of the semi-floating banjo type, built by the Timken company. The bevel gears give a reduction of 4% to 1. The brake drums are 10 in. in diameter with internal hand brake and external foot brake. A rear cover plate permits ready access to the differential, which may be removed through the opening. Timken bearings are used for the wheels and differential. The front axle is also a Timken.

Semi-elliptic springs are used all around. The rear springs have six leaves, are 48 in. long, 1 3/4 in. wide and are underslung. The front springs are 1 3/4 by 34 in. The muffler is a heavy tubular member which runs fore and aft over half the length of the car and serves as a torsional member for the frame. The frame channels are 1 1/2 in. by 4 in.

Among those who accompanied W. C. Durant at the unveiling were R. W. Judson, president of the Continental Motors Corp.; A. R. Demory, president of the Timken-Detroit Axle Co.; C. B. Hayes, president of the Hayes Wheel Co., and Harry O. Dunn, president of the Fisk Rubber Co. Others in the party were F. W. Warner, former general manager of the Oakland Motor Car Co., and several executives of the Durant companies.

Offices for the Starr Motor Co. have been rented at 511 Fifth avenue. The Durant Corp., which handles stock sales for the Durant enterprises, is located in the same building. The new company has not yet been incorporated and the names of those who will be the incorporators have not been disclosed.

Orders for June 15 delivery of the new car are being taken at Washington and purchasers are guaranteed against a reduction of prices. The Starr will be displayed in other cities before actual production is begun.

Actual count showed that 26,840 visitors inspected the new Starr car at its debut here. Durant expressed himself as highly pleased with the audience and the interest shown in his new product. Salesmen declared that several hundred people had expressed their intention to purchase the new car as soon as it was put on the market.

## JOBBER HOLD BIG MEETING

Portland, Me., March 12—Three hundred and thirty-nine Maine, New Hampshire and Vermont dealers attended a meeting and dinner arranged by the James L. Bailey Co., Farrar-Brown Co. and Post & Lester Co., New England jobber members of the Automotive Equipment Assn. Automotive equipment merchandising was the subject of the meeting and the "Ask 'Em to Buy" film was shown. Charles J. Bailey presided and Ray Lynch, of Post & Lester, made the principal address.

The meeting was the initial step in a co-operative undertaking of the three jobbers mentioned to assist the trade of northeastern New England territory in equipment merchandising, and also in association work. Several local dealer associations already have been formed, or are in process of formation, as a result of these and subsequent meetings engineered by the jobbers.

## Boston Adds Four Agencies As Proof of Sales Increase

Boston, March 3—One of the best evidences that business is picking up in New England is found in the placing of new agencies in Boston. Ordinarily it is very difficult these days to get some one to take on a line that has been dropped, or to take on new cars. But within a week Boston has been able to announce four definite, and two prospective agencies placed.

Frank W. Stockbridge, recently made president and general manager of the Jackman-Jameson Co., handling the Westcott, went west last week and on returning announced that he had added the Saxon Duplex to his line, taking all New England. Both the Saxon and the Moon had been dropped by companies that went out of business. The Rick-enbacker made its initial appearance here Monday at the salesroom of the Stevens-Clarke Co., that handles the Earl and National, and the Liberty was displayed Washington's birthday in its new home a few doors away where A. F. Chandler and James C. Tate, the latter handling Holmes, have quarters. It is expected that a new agency will take on the Ace. The Gray car made its first appearance last week in Boston, too.

## SOLONS STUDY ROAD BILL

Washington, March 13—The senate committee on post offices and post roads took under advisement today the report of a sub-committee recommending a minimum appropriation of \$50,000,000 annually for three years for highway construction. It also is proposed to authorize the expenditure of \$65,000,000 in 1924 and \$75,000,000 in 1925 as part of the federal aid to states. This legislation will be added to the general appropriation bill.

## Month's Production Gain Is Placed at 40 Per Cent

### Sharp Upturn in Retail Sales Features Early Spring Market Conditions Nationally

(Continued from page 27)

have been greatly encouraged and their optimism has been passed along to the factories. March always marks the real opening of the spring selling season, however, and April was one of the best months last year.

Predictions made in some quarters that the four months ending June 1 may establish a record for production undoubtedly are exaggerated although the volume of business will be large. The industry is establishing itself on a solid foundation for a long period of moderate prosperity. Notwithstanding a belated reduction here and there, it is evident prices have been fairly well stabilized. They are not likely to move sharply in either direction for several months.

While it has been expected that cultivation of the agricultural districts for sales in the fall would be profitable, this market for automotive products is producing business on a moderate scale months earlier than had been anticipated. Demand is becoming apparent for cars in the lower price classes and for light delivery trucks.

Business of parts makers naturally is reflecting the better tone apparent in the vehicle building field and the scope of operations is being steadily expanded. The same is true in tire plants where production costs have been lowered by greatly increased labor efficiency.

In spite of very heavy losses taken on inventories, the financial position of the industry at this time is stronger than was believed possible a few months ago. No important companies are in serious difficulties.

Every effort has been made to reduce liabilities and an enormous sum has been paid in the aggregate on bank loans and merchandise accounts. While the loss of \$38,000,000 by General Motors on the year's operations seems exceedingly heavy, that corporation is in reality in a much stronger position today than it was a year ago and a very satisfactory profit for this year is assured.

## FORD DENIES GERMAN PLANT

Detroit, March 13.—Henry Ford denies reports that he proposes to establish a huge branch factory in Germany in which to manufacture cars, trucks and tractors. It is understood this plan was given consideration but later abandoned. An extensive business in Holland and Belgium is being done through the Antwerp assembly plant, which was opened January 1. The territory covered includes Switzerland and Luxembourg. The manager is Don Critchley, formerly of the New York branch.

## Ohio Starts War on Ford Owner's Protective Assn.

Organization At One Time Wrote  
Insurance In Michigan, Wisconsin and Indiana

CHICAGO, March 13.—The State of Ohio has started a war to the last man against the operation of the Ford Car Owners' Protective Assn., with headquarters in Chicago.

It is declared that the insurance concern has been doing business in Ohio without the authority of the state insurance department and that it has defied the department to interfere with its operations. The company did business at one time in Michigan, Wisconsin and Indiana, until the insurance departments of these states put an end to its operations.

One of the first steps against the association in Ohio came in the arrest of S. M. Green, district manager, under an indictment charging him with selling insurance without a license and for placing insurance with an unauthorized company. It is said that other arrests will follow.

Charles W. Spicer, warden of the state insurance department, speaking on the subject, said:

"It is my opinion that every policyholder in the association is subject to arrest because every policyholder in a mutual or reciprocal company is a principal in the organization. In the future if I have trouble in locating direct representatives I propose to arrest policyholders.

"If other steps fail, we will take action against members of the organization. They are guilty of violating the state law inasmuch as they solicited business and received a small fee for each new member they secured. The penalties for soliciting subscribers to an unauthorized insurance company are heavy and they will be imposed."

### ILLINOIS STATE CONVENTION

Decatur, Ill., March 13.—The third annual convention of the Illinois Automotive Trade Assn. will be held here March 20. With the exception of the time to be given to one speaker of national prominence, the entire session will be given over to the affairs of the association. Every dealer interested in better conditions for the industry is urged to be in Decatur not later than 9 o'clock a. m. on the day of the convention. New officers for the coming year are to be elected.

### ASBURY PARK, N. J., TO STAGE SHOW

Asbury Park, N. J., March 15.—The Asbury Park Automobile Trade Assn. will hold a show here April 10 to 15. A number of the local dealers, including accessory merchants, will have displays.

### TO BOOST LINCOLN PRODUCTION

New York, March 13.—More than 500 Ford dealers from the Metropolitan dis-

trict, New England and New York state were guests of the Ford company at luncheon at the Commodore hotel recently. Several factory representatives were present, including W. A. Ryan, general sales manager.

Ryan referred briefly to the Lincoln car, saying that fifteen a day now were being turned out but that production soon would be increased to thirty-five. He added that Henry Ford expected large sales for the Fordson tractor at the new price.

### EARL REDUCES PRICE

New York, March 10.—Reductions of from \$90 to \$200 on the Earl cars and delivery wagons were announced here today by factory representatives. The new and old prices are:

	Old	New
Touring car .....	\$1185	\$ 995
Sedan and brougham..	1895	1695
Express delivery		
wagon .....	1085	995
Panel delivery wagon	1160	1060

The custom-built roadster remains unchanged at \$1485.

### MAIBOHM CREDITORS' PLAN

Toledo, March 13. Creditors of Maibohm Motors Co. have been granted five days to authorize a new plan for sale of the company to a syndicate of Sandusky citizens represented by A. C. Burch as agent. The new company will be capitalized at \$500,000 in preferred stock of two classes. Class A will be 6 per cent cumulative, dividends commencing two years from date of issue. Creditors will receive this pro rata with their claims finally approved. They will be represented by three directors on the board.

### L. G. PEED IS PROMOTED

Toledo, March 13.—L. G. Peed, for more than a year manager of the Willys-Overland branch in this city, has been named assistant sales manager of Willys-Overland, Inc. R. E. Butler, zone supervisor for Iowa, Nebraska and Missouri, will succeed Peed at the local branch. W. O. Kiracofe, formerly sales manager of the Banting Mfg. Co. here, has been named retail sales manager of the branch to succeed L. J. McCracken, who will have charge of the Pacific coast territory for Willys-Overland.

### CORRECTION

New York, March 10.—The statement that Judge Learned Hand had granted the Hudson Tire Co., Inc., of Newark, N. J., a permanent injunction restraining the Hudson Tire & Rubber Corp. of Yonkers from using the word "Hudson" on its tires was somewhat misleading. The court order permanently enjoins the Yonkers company from the use of the word "Hudson" without "some distinguishing affix thereto." In all other respects the temporary injunction against the Hudson Tire & Rubber Corp. was vacated.

## Milwaukee Street Railway Asks for Trackless Trolley

Property Owners Agree to Plan But  
Suggest That Company Be Responsible for Pavements

MILWAUKEE, Wis., March 13.—As the result of the success experienced by the Milwaukee Electric Railway & Light Co. in the operation of a number of motor buses as connecting lines to regular street car traffic arteries and similar uses, the utility has now applied to the Milwaukee common council for permission by ordinance to place in operation a "trackless trolley" on Lincoln avenue, which would be the first motor bus line using overhead trolleys for power in operation in Milwaukee.

The electric company suggests trackless cars as a means of economy, obviating the expense of laying tracks and paving within the track zone. Property-owners are agreeable save on the point that the utility should be compelled to bear the cost of keeping the pavement in repair at all times, since the operation of these cars probably will cause much greater wear and tear than that produced by ordinary vehicular traffic on asphalt, even that of heavy motor trucks with trailers.

### SUGGEST FOREIGN SURVEY

San Jose, Cal., March 11.—Thirteen motor car dealers, members of the California Automobile State Assn., have recommended a survey of the used car situation in foreign countries. George Habermeyer of Bakersfield suggested that twenty-five or more dealers get together and send a man to some foreign country to make connections for the sale of used cars from the United States. Different methods of appraisal were discussed and it was brought out that the dealers of San Jose are considering the information of a used car corporation for the disposal of their stocks.

### RULES ON RUM RUNNERS

Columbus, Ohio, March 13.—Automobiles used for transporting liquor illegally may be sold under the orders of the court, whether they were driven by their owners or by some other person. This is the ruling of Judge Scarlett in dismissing a replevin suit brought by John Buell to obtain possession of a car seized by enforcement officers. Buell claimed that he had no knowledge that the car was used for that purpose.

### 1920 PACKARD SERIAL NUMBERS

The serial numbers of the Packard Single Six were omitted from the Passenger Car Serial Numbers published in the Feb. 2 issue. Below is given this information together with a revision of the Twin Six numbers:

Year	Model	Cyls.	Price	Serial Nos.
1920	Twin Six	12	\$5550	160130 up
			Number on left front leg of motor.	
1920	Single Six	6	-----	U26 up
			Number on upper half of crankcase on right side.	



## California State Convention Refuses to Act as Salesman

### Denies Use of Headquarters as Sample Room—Endorses Control of Headlight Adjustments

(Continued from page 27)

cluded their leaving their respective establishments.

The Los Angeles Automobile Trade Assn. presented the following letter:

"Kindly advise us immediately whether we may send the following telegram to our senators and representatives at Washington:

Accessory Dealers' Division of this organization unanimously agree that, if bonus bill passes, a general sales tax be levied to raise the revenue, and that the stamp system of collection be adopted. Your careful consideration respectfully requested."

The state association replied to this letter, saying that the "telegram has merit, and undoubtedly will be instrumental in influencing our senators and representatives to cast their votes for the sales tax."

The work of the Commonwealth Club of California in undertaking an exhaustive survey of traffic conditions throughout the state was endorsed.

### Opposed by Association

Announcement was made that the Farm Bureau Exchange, organized some two years ago by Merced and Stanislaus county farmers to market their products in a co-operative manner, and to buy their supplies in a similar manner, had been disbanded. The California Automobile Trade Assn. has been opposing these exchanges and similar co-operative schemes throughout the state.

Santa Rosa was selected as the place for the next meeting.

J. S. McCray, superintendent of the theft bureau of the Pacific Coast Automobile Underwriters' Conference, explained the manner in which the National Automobile Dealers' Assn. had fought high insurance as a resistance to sales and told of company losses on theft insurance.

A motion prevailed instructing the secretary of the California association, to send a letter to all members selling new or used cars, urging them to put a private identification mark, the character and location of which should be known only to the dealer, on every car handled for the purpose of future identification.

### LIBERTY SALES ON BOOM

Detroit, March 13.—Liberty Motor Car Co., with a long string of orders piled up from the early 1922 shows, has entered upon a period of heavy production that will carry it through to early summer. The output for March will exceed that of any month in 1921 and the program for April calls for production and shipment of more cars than for any

month in the record-breaking year of 1920.

As an indication of the Liberty sales stimulus, the company declared that applications for retail sales rights were received from fifty-three dealers at the New York exhibit. Nine factory territorial men have been added to the staff to handle applications for unoccupied dealer territory.

Cliff Knoble has returned to his position as advertising manager of the company after an absence of several months. The company is going in for an extensive sales and advertising campaign which will be launched about April 1.

## January Production With Fords Reaches 90,486 Cars

New York, March 13—Production of passenger cars and trucks in the United States for January aggregated 90,486, including Ford. The total for December was 78,995 and for November was 116,349. The relative gain over December for January by manufacturers excluding Ford was 40 per cent on passenger cars and 38½ per cent on trucks. Ford's relative gain for January over December was considerably below this figure.

There are no production figures for January 1921 with which to make comparisons but the output this year was much larger than for the same month last year. Most of the increase for January over the preceding month was in passenger cars ranging in price from \$500 to \$1250.

## 400 Daily Production of Ford Tractors Is Schedule

Detroit, March 13—Ford Motor Co. will increase its tractor production to 400 daily in April, thereby doubling the present output. All parts of the country are represented in the increased business, the distribution being through the regular channels and in the usual quotas.

Production of cars and trucks is 34,000 ahead of production last year. January assembly at the plants approximated 40,000 against 30,000 January last; February with 52,649 compared with 30,305 last year.

### CANCEL LOS ANGELES SHOW

Los Angeles, March 18—There will be no automobile show in Los Angeles this spring. Instead, all energies will be devoted to making a success of Open Road week, which is scheduled for April. The directors of the dealers' association recommended a show in March, but lack of a suitable site was permitted to influence a decision in favor of indefinite postponement. Some dealers desired a tent show, but others were afraid to take a chance on the weather. The decision against a show did not meet with unanimous approval. Those dealers with new models were the strong advocates of the proposition.

## Timken Axle Co. Denies Affiliation with Others

### Has Not Combined with Parts Makers; Sales Agreements Not Financial Interests

Detroit, Mich.

Editor, MOTOR AGE:

Ordinarily we prefer to ignore rumors, but there have been so many persistent rumors recently concerning us and our connection with certain companies, which statements have made it appear that we are combining to enter into a warfare with certain companies, that we feel we must make a statement as to our position.

We are not in a combination with parts makers, either in the sale of units or servicing, nor are we in any combination with any automobile or truck manufacturer. We are in business to manufacture axles and sell them to anyone who is willing and able to buy and pay for them. It happens that for the purpose of serving the users of our product, we are selling parts to a number of parts stations who sell Continental and others, but that is purely an arrangement between us and the parts stations, and not a group arrangement between the unit makers.

### Denies Joining Parts Makers

The statement that we have joined with a number of unit makers, and the Durant or Gray Motors is untrue. It is a fact that we are now selling axles to the Durant Motors Co. for their six cylinder cars, which is made at Muncie, and we should be very glad to continue this arrangement and increase our connection with the Durant Motors. This is purely a sales arrangement, and has no other object than the selling of our product to a company that is in the automobile business.

### Feature Own Products

We are not so stupid as to attempt to attack any company in the automobile business, nor have we combined with any group in financing or promoting their business. We are confining our efforts, as we have in the past, to the manufacture of our own special product and selling it in a very legitimate way.

We feel we owe this statement to ourselves, to our customers, and to the trade in general. Briefly, our position is this—we are axle manufacturers. We own and control our business and consider every automobile and truck manufacturer as a possible customer. Every arrangement we have is a very simple contract for the sale of axles at a definite price, and our interest in the customer we sell is purely one of serving him as his unit maker.

Yours truly,  
A. R. DEMORY,  
President.

## Rubber Assn. of America Issues Warranty Bulletin

### Instructs 125,000 Dealers How to Make Adjustments Under New Sales Plan

NEW YORK, March 13—The Rubber Assn. of America has sent to approximately 125,000 dealers a poster on which is printed the standard tire warranty and claim form. Dealers are requested to display this poster prominently. With it the association has sent to each dealer a bulletin which says:

"The unsoundness of the former tire adjustment conditions is emphasized by the fact that clothing, footwear, household appliances and innumerable articles of utility (which are subject to service under conditions which the manufacturer cannot control or ascertain) are not sold with a definite guarantee of service and an unsound liberal adjustment policy. There is apparently no good reason why tires should be an exception. The abuse of the former condition in the tire industry tended to increase costs and the whole purpose of the present movement is to eliminate the economic waste.

#### Too Many "Policy" Adjustments

"Entirely too many of the adjustments formerly made were what the industry knows as "policy" adjustments. The dealer loses most by that kind of an adjustment because each tire thus furnished prevents a new sale by some dealer. It is no exaggeration to say that "policy" adjustments annually took millions of dollars from the pockets of the dealers alone.

"Under the standard warranty and claim form, only those tires which are faulty in material or workmanship will be considered for adjustment and then only upon the basis outlined in the second paragraph of the warranty. Tires cannot be adjusted, if run on wheels out of alignment, on snaky wheels or with lugs improperly tightened, causing unusual wear, or if damaged by either cuts, jabs, or stone bruises, or by underinflation or overloading.

"For the dealer, the new condition will eliminate much annoyance and loss of profit and it should remove all apprehension that some other dealer is going to do the thing that you know to be unsound and unbusinesslike. The consumer will benefit because formerly the careful user had to carry the burden created by the careless user. Now each user will pay his own way. If the tire is defective the owner can get fair treatment provided he makes a claim in the specified manner."

#### TABLET MARKS HAYNES START

Kokomo, Ind., March 14—As a result of the joint activity of the Hoosier State Automobile Association and the Kokomo Chamber of Commerce a historical tablet

has been erected on that stretch of the Pumpkin Vine Pike, three miles southwest of the city, where in 1894 Elwood Haynes made the first test of his automobile. The tablet designates the spot where Haynes and his companions started the car for the test. Haynes and several other well known men were present at the unveiling of the statute.

## Rolls-Royce Reduces Phaeton From \$14,900 to \$10,900

Springfield, Mass., March 13—A new price of \$10,900 for the Rolls-Royce phaeton, reduced from \$14,900, is announced by L. J. Belnap, president of Rolls-Royce of America. This price is guaranteed and represents a substantial economy to Rolls-Royce customers. In his announcement Belnap says that in the two years it has been on an operating basis, the company has determined its costs and perfected methods and organization in such a way as not only to equal but to excel the English built car. He adds:

"It is a fact that with the American mechanic, equally skilled as he is with the English mechanic, and excelling him as he does in enthusiasm and initiative, due to more favorable labor conditions, we are actually building the Rolls-Royce in America, not only better than it has ever been built before but more economically.

#### WONDERLICH ENTERS RACE

Indianapolis, March 14—Jerry Wonderlich, for three years a relief driver in Indianapolis 500-mile races, has his own mount for the 10th annual 500-mile International Sweepstakes event, May 30. Mrs. Mae Harvey, owner of one of the Frontenac fours which Louis Chevrolet built two years ago, has nominated Wonderlich to drive the car at Indianapolis. Both car and driver are now competing in the events on the various board speedways of the Pacific Coast.

#### GOODYEAR DEALERS CONVENTION

Ottumwa, Ia., March 14—General sales and inspirational conference of Goodyear tire dealers from all over southeastern Iowa will be held in the Hotel Ottumwa March 16. "Better Sales" will be the topic of business talks by factory heads during the afternoon meeting at which motion pictures of the Goodyear plant will be shown. F. S. Greisinger, head of the Des Moines sales branch, will preside.

#### OHIO SALES IMPROVE

Columbus, Ohio, March 14—A decided improvement in the demand for passenger cars in Columbus is reported by a majority of the dealers and distributors in this section. The improvement has been slow but steady since the annual automobile show early in February and is expected to continue.

## Country-Wide Reports Show Sales Increase Satisfactory

### Demand for Commercial Vehicles Growing Rapidly; the Low Priced Cars Lead

NEW YORK, March 14—Nearly 100 representative members of the National Automobile Chamber of Commerce who attended the meeting here recently were more enthusiastic than they have been for two years over the business outlook. Roy D. Chapin, president of the Hudson Motor Car Co., who presided, declared conditions were better than at any time since the depression began. He based this assertion upon reports from manufacturers and dealers all over the country.

These dealer reports were virtually unanimous in the statement that February business was materially better than January. One striking fact disclosed by the survey is that the situation in agricultural sections has improved. Even in the Dakotas the tone is much better. Only one of the many reports received described business as not so good.

Dealers used such adjectives as "good," "big," "bright" and "better," in describing the outlook for sales this month and next. This optimistic forecast was based on the belief that prices have been stabilized and that was the unanimous plea of the dealers.

Truck as well as passenger car sales have improved and the demand for commercial vehicles is growing steadily.

Sales of high-priced cars in the New York metropolitan district were 39 per cent larger in January than in January, 1921. Sales of low-priced cars were 25 per cent larger. Sales in the \$1,000 (wholesale) class doubled in January as compared with December and in the \$500 class they almost doubled. The greatest decrease in the January sales as compared with December was in the class above \$4,000 and in the \$1,500 class. Sales of one-half-ton and three-quarter-ton trucks more than doubled.

A report made to the members on the New York and Chicago shows disclosed that they were the most successful ever held from the standpoint of attendance. A return of 77 per cent of their footage costs was ordered for members who exhibited at the New York show and of 91 per cent to those who exhibited at Chicago. This was in addition to retaining \$25,000 in a trust fund for a show building. This fund will be used as a guarantee that a suitable exhibition place will be available in New York.

#### 55 CARS BURN AT BENTON

Benton, Ill., March 13—Fifty-five automobiles were destroyed March 7 in a fire which razed the L. C. Bayless garage. Loss will total \$75,000.



## Des Moines Show Scores With Big Sales as Result

**Farm Produce Prices Reach Higher.  
Plane; Farmer Again Made  
Prospective Buyer**

DES MOINES, Iowa, March 15.—Gloom has disappeared in Iowa. If the thirteenth annual show of the Des Moines Automobile Dealers' Assn., held this week, did anything it crystallized the sentiment among the dealers of the state that the corner had been passed and that business has started on the upgrade.

Psychologically, the Des Moines show could not have been held at a better time this year than the week chosen. For the past thirty days has seen a wonderful recovery in Iowa among the farmers, and the farmer is by long odds the most important individual in the state as a business prospect.

During the past sixty days prices of farm products have shown a material advance.

Another proof of the fact that conditions have improved is that obligations of Iowa banks with the federal reserve banks have been decreased from a maximum of \$98,000,000 to \$62,000,000.

So with these facts in mind it is not hard to understand why the motor car dealers and distributors are looking brighter. They understand that there is still a long, hard pull ahead, but conditions are so much better with the farmer, and business in general has shown such a material improvement that they felt their feet are once more on solid ground.

Attendance at the Des Moines show, both from the public and dealers, is the largest in the history of the show. Paid admissions show an increase of 20 per cent over 1921 and Wednesday night saw the largest crowd which ever attended a Des Moines show. Dealer attendance is 100 per cent ahead of last year and many dealers brought prospects with them and closed deals on the ground.

Prospects have evidently decided that prices have become stabilized, and they are ready to buy. As evidence of this, witness the fact that a Des Moines distributor of a medium priced car sold at retail during the last two weeks twenty-

one cars, which is the equal of any period in the history of his business.

The Des Moines show this year was a brighter, snappier show than any of its predecessors. Managers of the show tried out the prize contests for salesmen and it produced the most courteous, snappy, efficient bunch of salesmen ever seen at a local show. A first prize of \$15 and a second prize of \$5 was offered each day to the salesman who made the most favorable impression upon an unknown prospect. These prospects, or critics, were men chosen from the automotive equipment representatives from outside of Des Moines and their finds were issued each day to the dealers in mimeograph form.

No trucks were shown this year on account of lack of room and the exhibition was confined exclusively to passenger cars and automotive equipment.

## Ohio Judge Holds Garage Is Responsible for Stored Car

Columbus, Ohio, March 14.—In a recent court decision in Cleveland where the question at issue was the responsibility of a garage owner for cars stolen while in their keeping it is held that unless there is a special contract the garage owner is so liable.

As a bailee he is required to use the care of an ordinary prudent man under similar circumstances, and if the automobile stored with him is lost or stolen because of lack of such care he is liable to the owner unless he enters into a special contract to relieve himself of such responsibility or by making a leasing contract for a certain space in his garage for storage purposes, but in such event he must make it plain to the owner that the space is being leased and must draw the attention of the owner to all of the terms of the contract or leasing arrangement.

A garage owner is never liable without neglect or carelessness, except when he enters into a special insurance contract. However, when an automobile is stolen from a garage it is prima facie evidence that the garage owner is negligent and careless. Such evidence, however, can be rebutted by the garage man.

## 684 Tractor Users' Report Shows Majority Is Pleased

**The Work Done Better Than When  
Horses Are Used; Average  
53 Work Days**

WASHINGTON, March 11.—Analysis of reports received from 684 tractor owners in Alabama, Georgia, North Carolina, South Carolina and Tennessee shows that a preponderant majority are satisfied with the effectiveness of tractors and are using them to replace horses wherever possible. The division of agricultural engineering, department of agriculture, made this study to determine the views of tractor owners and estimate the possibility for sales.

All of the men whose reports were used in this study purchased their tractors between March, 1918, and September, 1920. The average first cost of the machine was \$1,050, and the average of life was 7.6 years. On this basis the annual depreciation charge is \$138 per year.

Each owner was asked the number of total days' work done per year with his tractor, and the average of the replies was 53 days. The two-plow tractors were used an average of 52 days per year and the three-plow tractors, 56 days.

About one-half of the men did some custom work with their machines, but over 90 per cent of the total work done by these tractors was on the home farm. They were used more for plowing than for any other one operation.

Over 90 per cent of these men stated that the quality of the plowing done with their tractors was better than that which they formerly did with horses or mules. The tractors drawing disk plows used on an average about three and one-half gallons of fuel per acre for plowing and those drawing mold board plows about three gallons per acre. This difference between the fuel required when using disk and mold-board plows is due largely to the fact that the disk plows are narrower than the mold-board plows, and the acreage covered per day is correspondingly less. The two-plow tractors used about 17 gallons of fuel per day

## Convention of Western Canadian Automotive



for plowing, and the three-plow tractors about 21 gallons per day.

The average cost (including charges for depreciation, interest, repairs, fuel and oil) per acre of using the two-plow tractors for plowing in 1920 was \$2.07, when using gasoline, and \$1.73 when using kerosene. For the three-plow tractors it was \$1.90, when using gasoline, and \$1.59 when using kerosene. These costs are based on 31 cent gasoline, 20 cent kerosene and 85 cent lubricating oil, the average prices which these farmers paid during 1920. The repair costs were computed on the basis of an annual repair charge of 4 per cent of the first cost of the machines, and interest was charged at 8 per cent on the average investment. On account of the smaller acreage covered per day and the greater amount of fuel used per acre, the cost of plowing with the disk plows was somewhat greater than was the cost when using mold-board plows.

Each class had owned their machines about one and one-half years but the repair costs of the satisfied owners had been only \$33, while those of the dissatisfied owners had been \$170. The tractors which were proving satisfactory had been out of commission when needed an average of two days during the year preceding the time of reporting, while those which were proving satisfactory had been out of commission 14 days.

A comparison of the reports of the men who were satisfied with their tractors with those who were dissatisfied, showed that in some cases the failure to take advantage of the opportunity offered by the tractors to increase the acreage and reduce the work stock was probably responsible for the dissatisfaction, in other cases the poor service rendered by the tractor was responsible, and experience has shown nearly one-half of the dissatisfied owners that their present tractors are not the proper size for their farms.

#### N. A. C. C. ENTERTAINS McDONALD

New York, March 15—Thomas McDonald, chief of the Bureau of Public Roads, was the guest of honor at a dinner given by the Highways Committee of the National Automobile Chamber of Commerce at the Hotel Ambassador. Most of the guests were representatives of

newspapers, trade and business papers. The purpose of the meeting was to discuss the present status of highways in the United States and to enlist wide spread cooperation in highway construction and maintenance work which will be carried on in the next few years. Edward F. Jordan, president of the Jordan Motor Co., presided. George M. Graham, sales manager of the Peerless Motor Car Co., emphasized the essential character of motor vehicles.

### Transportation and Communications

WASHINGTON, March 14 — The time is not far distant when motor vehicle transportation will be universally recognized, in the opinion of Will H. Hays, postmaster general. His belief is expressed in the following statement:

"A little while ago I read an article by H. G. Wells that I wish might be read by every business man; in fact it could be read with advantage in every school house in America. Wells traced the development of civilization to two factors, transportation and communication. These have been the vital factors that have enabled human beings to develop so marvelously and so rapidly in the last few hundred years.

"The Post Office Department is the government department of communications. We are all glad and proud to be associated with one of the vital factors in civilization. But we also touch upon transportation, and I look forward to a time not far distant when motor vehicle transportation will be universally recognized as one of the vital factors in the development of civilization."

#### TO FIGHT STATE'S CLAIM

Toledo, March 13—Receivers for the Willys Corp. have asked Judge Killits here for authority to combat the state of Ohio on the matter of an annual assessment against the corporation which, they allege, is levied and collected under a statute that is unconstitutional.

The claim of the state against the company is for \$89,556.40.

### Republic Motor Truck Co. Is Reorganized with Willys Out

Frank E. Smith New President; Executive Offices Moved from New York to Alma

NEW YORK, March 13—Complete reorganization of the Republic Motor Truck Co., Inc., has followed the resignation of John N. Willys as president, and the election of Frank E. Smith as his successor. Other resignations included those of H. I. Shepherd as treasurer and Walter P. Chrysler and James E. Kepperley as directors. Shepherd will continue temporarily as a director as will W. J. Baxter and E. C. King.

New directors elected to fill the vacancies were: O. W. Hayes, vice president in charge of engineering, purchasing and production; H. D. Minich, vice president in charge of finance and accounting, and Charles G. Rhodes, secretary.

It is understood that there has not been, up to this time, any change in the stock control of the company which has been held jointly by Willys, Baxter and Burt but this is forecast by a statement of the company that "these changes bring back to the west control which was transferred to New York at the time Willys and his associates purchased the stock of the company."

The executive offices of the company have been removed to Alma, Mich., where the plant is located. It is understood that Shepherd will join the organization of one of the large Cleveland banks.

Michigan and Illinois bankers are taking an important part in the affairs of the Republic. As soon as the banks can obtain control of all the notes on which the company defaulted the new money necessary for working capital will be provided. The company now has current assets of \$4,600,000 after taking a loss of \$1,000,000 on its inventory. While truck sales were light last year the company made a large profit on parts replacement business. With the improvement in the truck market and with the readjustment of finances, it is confidently expected the company will be able to move ahead on a substantial basis.

### Equipment Dealers, Winnipeg, February, 1922





## CONCERNING MEN YOU KNOW

Edgar T. Glass, New Britain, Conn., for several years past sales manager of the tractor division of the New Britain Machine Co., has resigned, and, according to President Herbert H. Pease, of the corporation, has "other things in view."

George W. Moore, 73, for more than 15 years proprietor of the George W. Moore & Son, trucking and furniture moving business, Bridgeport, Conn., died at his home here, following an illness of two months.

John Dew, Jacksonville, Ill., has been appointed manager of the Chain Tire Store, opened on March 1, by the World Tire Store Corp.

Byron F. Smith, Springfield, Ill., has opened a tire, oil and accessory store for motor vehicles.

G. Vernon Beck, late of Decatur, Ill., and for many years prominent in the automotive industry of central Illinois, has been appointed sales manager for the Bruce Automobile Co., Springfield, Ill.

Rollo Kennedy and Frank Weeks, Trenton, Ill., have opened a garage and will specialize in repair and storage.

L. G. Feed, Toledo, Ohio, for more than a year manager of the Willys-Overland, Inc., has been named assistant sales manager by A. C. Barber. R. L. Butler, zone supervisor for Iowa, Nebraska and Missouri, will succeed Feed at the local branch. W. O. Kiracole, formerly sales manager of the Banting Mfg. Co. here, has been named retail sales manager to succeed L. J. McCracken, who will have charge of the Pacific coast territory for Willys-Overland.

C. C. Hollenbeck, sales manager of the Pomerooy-Bray Motor Sales Co., Chicago, Ford dealers, reports that the actual sales for the last month were far in excess of what was expected and that March sales, in two weeks passed the quota they had placed for the entire month.

L. J. McCracken, sales manager of the Toledo branch of the Willys-Overland Co., has been appointed acting manager of the Los Angeles branch, one of the most important properties in the entire Willys-Overland branch organization.

Harry G. Sparks, sales manager of the automotive equipment division of the Sparks-Withington Co., Jackson, Mich., spoke to 800 students of the Michigan State Auto School, on "Motor Horns—How to Sell and Service Them." The Sparks-Withington film, "Tooting Your Own Horn," which is a supplement to the Automotive Equipment association "Ask 'Em to Buy" film was run.

R. G. Craig has been named manager of the New York branch of the Dort Motor Car Co., succeeding F. L. Sanford, who resigned to join the Dodge New York organization. Craig was formerly Dort manager of sales at the New York branch.

J. M. Mather, late Pacific northwest territorial manager for the White Service company of Cleveland, announces that the company will open a sales branch and service station at Spokane under his management.

B. L. Cook, of the J. I. Case Threshing Machine Co., has been elected president of the Spokane Tractor association. E. W. Hill, of the Cleveland Tractor Co., was elected vice president, and A. S. Fetterman, of the Spokane Mfg. Co., secretary-treasurer. P. McGovern, the retiring president, and George H. Summers were elected to the board of trustees.

John M. Lund, 58, for many years proprietor of a livery stable on the site where he has for some years past conducted a leading garage and service station, died this week.

Hamilton W. Jones, general manager of the Hartford, Conn., branch of the New York Motors Corp., has resigned to enter the export field with which he was most actively identified in South Africa for several years. His successor has not been announced.

Eisle A. Pierson, service manager of the Mack Motor Truck Co., Hartford, Conn., and president of the Automotive Service Assn. of Hartford county, has resigned to accept a similar berth with the City Auto Repair Co., Hartford, Conn.

Fred J. Wood has resigned as service manager of the City Auto Repair Co., Hartford, Conn., and has acquired the majority holdings in the Salisbury Service Station.

C. C. Adams and Henry Krantz, Dover, Ohio, have been named receivers for the Tuscora Rubber Co., a \$1,500,000 company making special rubber articles at this place. The corporation was organized in 1919 and started operations in 1921. There are approximately 1600 stockholders over Ohio and West Virginia.

Northern Wheel Co., Alma, directors have elected Frank W. Ruggles, president of the company for the coming year. A. C. Chapman was named vice president and general manager; J. W. Blakeley, vice president; Orville Allen, secretary; Charles O. Ward, treasurer.

Jeremiah O'Herron, Avon, Ill., has sold his interests in the Avon Motor Car Co. to Fred Fahner, who will operate the plant alone, distributing the Ford car. O'Herron will operate a battery service station.

T. J. Noblett has been appointed distributor of the Jordan car at Springfield, Ill., and has opened a sales agency.

M. B. Hoagland, president of the Signal Truck Corp., Detroit, has appointed Earle T. Sutton to the factory staff.

William M. Sweet has resigned as a director of the Bearings Service Co., New York, and will be succeeded by A. C. Hitchcock, sales manager of the New Departure Mfg. Co., one of the concerns for which the Bearings company acts as a service department. William A. Brooks also has resigned as secretary of the Bearings company and has been succeeded by W. J. Onge, sales manager of the company.

William E. Betts has been appointed advertising manager of the Studebaker Corp. of America, South Bend, Ind.

Frank Miller, president of the West Side Buick Co., Chicago, is in Houston, Texas.

Walter C. Lyons, New Haven, Conn., president of the Packard Sales and Service Co., was killed and John M. Curtis, his service manager, and Wilfred L. Aubry, a chauffeur, were badly hurt when a car in which they were riding hit a telegraph pole in the outskirts of the city and turned turtle in a field 200 feet distant. Lyons was dead when help reached the scene.

Fred C. Ruch has been succeeded as secretary of the Auto Body Co., Lansing, Mich., by John W. Haarer, cashier of the City National Bank. J. Edward Roe, president of the American State Savings Bank was named treasurer. F. N. Arbaugh continues as president, Harris E. Thomas, vice president; W. V. C. Jackson, vice president and general manager. Ruch continues as a director. Other directors in addition to the officers are E. S. Porter, A. C. Stebbins, C. E. Bement and Richard Price.

H. C. Smith, who has just resigned from engineering work in the aviation department of the government for some four years, has been appointed district sales supervisor for Earl Motors, Inc., with headquarters at Evansville, Ind.

operations to the phaeton for the first few months and will start the sedan about May 1. The other models, roadster and coupe, will be added later. The phaeton is priced at \$1,065 and the sedan at \$1,395. Prices on the other models have not been fixed.

Manufacturing of the Jewett line will be carried on at the Paige factories. Two new assembly tracks will be laid out for the Jewett line. There is sufficient room at the factory for both Paige and Jewett production in 1922, according to factory engineers.

## Wilson of Maxwell Says Car Is No Longer Sold by Phone

### Declares Harder Selling Is for Good of Entire Industry—Public Critical

DETROIT, Mich., March 13—The process of deflation has gone farther in the automotive industry than in any other, in the opinion of William Robert Wilson, president of the Maxwell Motor Corp. Discussing the general situation in the industry, he said:

"The automobile manufacturer realizes that competition is keener than ever, that there must be no doubt about his product, but that the good car, correctly priced, need have little fear of a satiated market. Also, that conservative marketing and expert fingers on the pulse of demand will establish the automobile business on a more stable basis than ever.

"The automobile dealer is of his own wise, converted to a firmly conservative business policy. He knows that the day of the telephone order is gone for good—for the good of all concerned. He is in a frame of mind amicable to present conditions. He knows that he must go after business and is fully aware that the offer of real service is a genuine sales need. He is prepared to follow these dictates for on them his 1922 success is assured.

"I believe the public is more deeply interested in the automobile than ever, but more critical. It is selecting cars more carefully and is more insistent on quality as evidenced by the New York and Chicago shows. The New York show drew record attendance, but not record sales, yet those manufacturers who offered a product of evident value found an agreeable amount of business."

## GRAY PLANS UNCHANGED

Detroit, March 14—President Frank L. Klingensmith, of the Gray Motors Corp., says that the plans of that company will not be changed in any way by the production of a \$348 car by W. C. Durant. Practically all the equipment for the manufacture of the Gray car is now ready and it is expected shipments will start about April 10. The price will be announced before that time.

"There is room for a number of manufacturers in the low priced field," Klingensmith said, "and we are looking for about 10 per cent of the business."

## PIERCE-ARROW TAKES LOSS

New York, March 15—A total loss of \$8,763,712 for the year 1921 is reported by the Pierce-Arrow Motor Car Co. after all interest charges, depreciation, inventory adjustments and operating expenses. As a result the balance sheet on Dec. 31, 1921, showed a profit and loss depreciation of \$4,422,165 against a profit and loss surplus of \$4,541,646 at the end of the previous year.

## Jewett Production Schedule Calls for 500 Cars in March

Detroit, March 14—Jewett Motors will get into production March 10 on its phaeton car model and will build about 500 cars the first month. This schedule will be increased to about 1,800 in April and will continue at that point until July 1, by which time 6,000 cars will be completed. A new schedule will be laid out at that time.

The company will confine its building

## IN THE RETAIL FIELD

Elvers & Rhode Co., Madison, Wis., is a new \$15,000 corporation formed by A. Rhode, H. E. Elvers and others to deal in automotive accessories of all descriptions.

O. E. Clymer, Amery, Wis., has sold his interest in the Fay Auto Co. to E. M. Fay and A. W. Hughes and will move to Bloomer, Wis., to accept the Ford dealership.

Salem Avenue Garage, Kenosha, Wis., is a voluntary bankrupt. It schedules assets of \$9,884 and admits liabilities of \$16,777.

Madison Chandler Co., Madison, Wis., has been incorporated with \$10,000 capital to buy and sell motor cars, automotive equipment, etc. The incorporators are W. L. Osgood, Frank Weger and Marion Osgood, all of Madison.

Fethofer Bros., of Valmy, near Sturgeon Bay, Wis., suffered a loss of \$18,000 by fire which destroyed the garage and repairshop. A new fire-proof building will be erected at once.

Fritz & Wells, Park Falls, Wis., are building a new public garage and service station, 51 x 70 ft., two floors, to be ready April 1.

Charles Ceaff, Shiocton, Wis., has let contracts for the erection of a public garage and repairshop, 40 x 80 ft., estimated to cost \$15,000 equipped. Ed Moran & Sons, Madison, Wis., have opened a tire and accessories store. It will operate under the franchise of the World Tire Corp. group of 600 retail stores.

Vesta Battery dealers in the Wapello County (Iowa) Motor Trades bureau district, made dealers' day a gala day for their numbers. They attended the show in a body, had lunch at the Commercial club and heard an address by H. W. Ridgen of the Vesta Corporation.

U. M. Lange and C. S. Tscherner, Dubuque, Iowa, have purchased the Peter Even & Son auto agency and will continue the business in the same location. They have added Reo and Federal trucks to their dealers' lines. Joseph Even, of the retiring firm, will devote his entire time to the Ford agency.

Simmons Motor Car Co., Chicago, distributors of Grant, moved their headquarters last month. Wire Wheel Corp., Chicago, has moved to larger quarters.

H. T. Webber, late of Aurora, Ill., will open a tire and accessory store at Galesburg, Ill., in the near future. It will be known as the Speed Tire Shop.

James M. David, Rock Island, Ill., who has been conducting a tire and vulcanizing shop for several years, has filed a voluntary petition in bankruptcy. He listed liabilities of \$2,737 and assets of \$1,621.

R. W. Rank, Moline, Ill., is preparing plans for a \$10,000 garage and auto display room. Drew Donaldson, Rock Island dealer, will occupy the building.

Christie Thomas Auto Sales Co., Greencastle, Ind., has installed a radio telephone and amplifier in its sales rooms as an advertising feature. From the many visitors the company is adding many prospective purchasers.

The Ford Agency, Spartanburg, S. C., has been taken over by Ernest Burwell, of Charlotte, N. C. Dr. Elwood F. Bell, in charge of the Ford Spartanburg agency until March 1, is now with the Bell-Brown Motors Co., handling the Oldsmobile.

F. H. Brusky, St. Paul, has obtained the St. Paul agency for Haynes cars. Brusky plans to handle the Haynes in addition to the Davis cars, which agency he now holds.

M. S. Charlton, Ft. Wayne, Ind., formerly assistant advertising manager of the Peerless Motor Car Co., has joined the organization of C. H. Kines, local Peerless dealer.

Dean Motor Co., Moline, Ill., has made an enlargement by which a repair shop is added to the plant.

Constant & Groves, Springfield, Ill., have been appointed distributor for the Chandler car in the Sangamon county territory.

A. G. Medlicott has been appointed manager of the Springfield (Mass.), branch of the Packard Motor Car Co., to succeed V. A. Guyer, who resigned to become manager of the New Jersey division of the York Motors Corp., Lincoln distributors. Mr. Medlicott was for some time at the Packard factory and more recently was connected with the company's New York office.

Florence Garage, Inc., has been chosen by the Springfield Durant Co. to handle Durant cars in Northampton, Mass., and has begun the erection of a new building to be ready for use in May.

Ralph T. Pierce, for 10 years with the Donovan Motor Car Co., Boston, has been appointed service manager for the F. G. Parker Co., Studebaker distributors in Springfield, Mass.

Oakland Agency of North Adams, Mass., is about to open a branch in Pittsfield, with J. B. Lyerly in charge.

G. A. Ashton Co., St. Paul, Minn., large dealer in accessories, has opened a new place of business. This company handles all leading motor car accessories as manufacturers' agent.

Wolf & Wright, Lena, Ill., have opened a modern garage, dedicating it with a public reception that attracted several thousand persons. Hand-some souvenirs were given away.

other spring includes divisions undergoing reorganization and rearrangement including some cases of complete abandonment and liquidation.

Net sales in 1921 for the class A, or thoroughly organized units of the corporation were \$225,261,110 as compared with \$370,288,235 in 1920. The net sales of the class B units, or those undergoing reorganization last year, were \$79,226,133 as compared with \$197,032,368 in

1920. The total for 1921 was \$304,487,243 as against \$567,320,603 in 1920.

The net earnings of the class A units were \$29,671,494 while there were losses of \$16,431,547 on the class B units, leaving net earnings from operations as a whole of \$13,239,946. From these earnings were deducted interest of \$5,281,084 on notes payable and \$2,174,080 for the employees' investment fund leaving a net income after ordinary charges of \$5,784,782.

Charges for extraordinary losses and adjustments were: write down of inventories Dec. 31, 1921, to cost or market, whichever was lower, \$16,603,073; provision for refunds due dealers and distributors on account of price reduction effective Jan. 1, 1922, \$2,441,376; cost of cancellation of commitments, rebates on sales in 1920 account of price guarantees and other miscellaneous losses charged off in 1921, \$11,421,102; special reserve established Dec. 31, 1921, to cover anticipated losses and unforeseen contingencies pertaining to 1921 or prior years but not at present definitely ascertainable, \$14,000,000, making a total of \$44,465,552.

A condensed comparative consolidated balance sheet as of Dec. 31, 1921, and 1920 is shown below.

### DEALERS TO REORGANIZE

Wilmington, Del., March 15—A meeting of the stockholders of the Wilmington Automobile Co., the largest motor concern in the city, has been called for March 13 to act upon a resolution passed by the directors on Feb. 21, proposing dissolution of the company. The purpose, it is understood, is to reorganize along broader lines. Heretofore the company, of which F. B. Norman is the head, has handled General Motors lines. It is proposed to take on others also, and the name will be changed to the Wilmington Auto Co.

### KOKOMO SHOW

Kokomo, March 14—Surprising crowds taxed the capacity of the automobile show this week. It is the first show staged in Kokomo on a big scale. More than 28 exhibits make up the show, for which a local dealer's building was loaned.

## GMC 1921 Sales Fall Off \$262,833,360 Against 1920

Net Earnings From Operations Were  
\$13,239,946; Losses for Year  
Total \$44,465,551

NEW YORK, March 13—A preliminary report of the General Motors Corp. for the calendar year 1921 shows a net income after ordinary charges of \$5,784,782 but after charges for extraordinary losses and adjustments aggregating \$44,465,552, there remained a balance of \$38,680,770 to be charged against surplus.

A statement by Pierre du Pont says that a statement of 1921 earnings would be misleading if attention were not called to the losses and adjustments in units undergoing liquidation and reorganization. To make this situation clear, he divides operation of 1921 into two classes, one of which includes the divisions thoroughly established and whose products is so standardized that it does not require readjustment. The

## Summary of GMC Annual Statement

### CURRENT ASSETS

	Dec. 31, 1921	Dec. 31, 1920
Cash in banks and on hand.....	\$ 40,057,401.53	\$ 47,332,842.21
United States Government bonds.....	5,228.04	41,262.21
Marketable securities .....	27,009.31	34,096.31
Sight drafts against B/L attached and C. O. D.....	4,677,241.39	9,667,580.59
Notes receivable .....	4,794,978.99	13,449,376.90
Accounts receivable and trade acceptances, customers and others .....	18,944,844.09	22,233,886.80
Inventories at cost or market, whichever is lower.....	108,762,625.35	164,684,678.72
Prepaid expenses .....	1,944,988.35	1,891,854.06
Total current assets.....	\$179,214,317.05	\$259,335,577.80

### CURRENT LIABILITIES

Accounts payable (and trade acceptances in 1920).....	\$ 15,640,429.41	\$ 27,160,681.23
Notes payable .....	48,974,996.29	72,421,451.45
Taxes, payrolls and sundries accrued not due.....	15,894,778.40	14,101,794.90
Accrued dividends on Preferred and Debenture stock, payable February 1.....	1,043,763.07	1,018,943.73
Total current liabilities.....	\$ 81,553,967.17	\$114,702,871.31



**SHALER COMPANY TO REBUILD**

Waupun, Wis., March 13.—Arrangements to build a new plant on a scale exceeding that of the one totally destroyed by fire March 3 are being made by the C. A. Shaler Co. of Waupun, Wis., manufacturing vulcanizers, tire and rubber repair equipment, headlight lenses and other automotive specialties. Although the loss was a heavy one, only a part of the damage of \$300,000 to \$350,000 being covered by insurance, the industry will engage immediately in the rehabilitation of its productive facilities. C. A. Shaler, founder and president of the company, was in California at the time of the fire, and upon being apprised of the details, wired instructions to R. B. Dunlap, secretary and sales manager, to proceed with reconstruction as early as possible. The Shaler company carries a large amount of business on its books and new business has been developing at a most satisfactory rate for the last few months, keeping the factory fully occupied, with overtime schedules in effect in some departments.

**SERVICE TRUCK PRODUCTION**

Wabash, Ind., March 14.—Production on the new model Service truck, begun February 15 on a four-a-day basis, has been maintained and the steady addition of men to the working force is rapidly completing arrangements for production on the \$3,500,000 order for the Polish government. None of this goods has yet been turned out.

Sale of a considerable quantity of gold notes, in America, to Polish families, being organized by a syndicate of Polish bankers which underwrote the order for several million dollars' worth of Service truck equipment.

**ASHLAND DEALERS ORGANIZE**

Ashland, Wis., March 13.—The Ashland (Wis.) Automotive Dealers' Assn. has been organized with a membership of 12 for mutual progress and protection, and becomes affiliated with the Wisconsin Automotive Dealers' Assn. Joseph Brown, Ford dealer, was elected president; Louis Filiatrault, of the Ashland Motor Service Co., secretary, and George White, of the Milavetz & White Garage, treasurer.

**TIRE DEALERS ORGANIZE**

LaCrosse, Wis., March 13.—Tire dealers of LaCrosse, Wis., one of the principal cities in western Wisconsin, have come together. The new organization is known as the LaCrosse Tire Dealers' Assn., and its officers are: President, John L. Ash; vice president, H. H. Lehman; secretary and treasurer, B. M. Count.

**DALLAS DEALERS REPORT SALES**

Dallas, Texas, March 15.—The third month of the year started off with a rush so far as actual retail automobile sales were concerned. The first week of March set a new record for sales by the Dallas dealers, except of course the week

of the automobile show. It was said by a half dozen dealers that the retail sales for the first week of the month were 15 per cent above those of the first week of February or those of January.

**BUDD WHEEL INCREASES SERVICE**

Philadelphia, March 10.—The Budd Wheel Co., which now has more than 50 service stations located with well established wheel dealers and repairmen in the larger cities of the United States and Canada, is steadily expanding its service system. All of these stations are carrying spare parts for both wire and disk wheels in addition to an assortment of wheel parts and equipment. The service stations also are prepared to make repairs on wheels and they soon will be provided with apparatus for straightening disk wheels. Inasmuch as the Budd-Michelin disk is manufactured to the same dimensions as the Michelin wheel in Europe, it is possible for these stations to equip imported cars.

**RAILWAY FAVORS TRUCKS**

Baltimore, March 10.—The Merchants' & Manufacturers' Assn. has been informed by the Pennsylvania Railroad of a plan for motor truck distribution of freight is under consideration for this city. It is the belief of Robert C. Wright, general traffic manager of the Pennsylvania, that the vast volume of less than carload traffic congests the rails of the terminals and interferes with the proper handling of carload traffic. For that reason, he believes it should be eliminated entirely from important stations and provided for by the construction of a large warehouse on the outskirts of the city from which store-door deliveries would be made by motor truck at the expense of the railroad.

**PAGEANT SHOW THIS SUMMER**

Chicago, March 10.—At a dinner given by the Hotel Assn. in the La Salle hotel March 7, Mayor Thompson outlined his plans for the second Pageant of Progress exposition to be held on the Municipal pier the latter part of July. John Dill Robertson, former health commissioner, will be in charge of all arrangements. This pageant presents an opportunity for automobile dealers to display their cars in midsummer to people attending from all parts of the country. Last year the attendance was approximately 1,000,000.

**OTTUMWA SHOW SUCCESS**

Ottumwa, Iowa, March 13.—Third annual automobile show of the Wapello County Motor Trades Bureau, which has just closed, proved highly successful not only from point of attendance but from floor sales. Dealers reported encouraging business and bright lists of prospective buyers. Frank Lynch, manager of the show, claimed that it had established a record for southeastern Iowa in the face of discouraging financial atmosphere.

**INTERMOUNTAIN OFFICIALS**

Salt Lake City, Utah, March 10.—Frank Botterill, president and general manager of the Botterill Automobile Co., this city, was chosen president of the Intermountain Automotive Trades Assn. at its annual meeting.

Botterill succeeds Russell Richards, of the Hyland Motor Car Co., Salt Lake City, who served as president for two terms, the first two years of the association's existence. Carl L. Snow, this city, was elected secretary-manager in place of Charles C. Backes, who has resigned. V. A. Culver, sales manager of the Motor Mercantile Co., was elected treasurer. Lewis P. Haines, vice president, is manager and treasurer of the Ogden Motor Car Co.

The show this year was the most successful in the history of the movement locally. About 50,000 persons were in attendance and unusual interest and enthusiasm were shown by the visitors.

**PRESENT BRONZE TO LELAND**

Detroit, March 10.—A miniature replica in bronze of the St. Gauden's Lincoln, standing about three feet in height, was presented to Henry M. Leland on his 79th birthday in February by the 10 original Lincoln distributors. The occasion of the presentation was made one of general participation by all employees and dealers, the former contributing a huge cake to the ceremonies and the latter a bouquet of 79 American Beauty roses. There was a general reception in which speeches were made by Henry M. Leland and other officers. Henry and Edsel Ford attended.

The distributors who sponsored the gift of the statue, and whose names are inscribed on a tablet commemorating the occasion, are H. M. Allison, M. J. Budlong, J. M. Fitzgerald, O. C. Funderburk, J. H. Lifsey, R. P. McCurdy, J. C. McNiece, W. M. Murphy, C. P. Stephens and James Sweeten, Jr.

**EVANSVILLE SHOW**

Evansville, Ind., March 14.—Attendance at the annual show of motor cars, conducted in the Memorial coliseum by the Evansville Automobile Dealers' Club this week, exceeded expectations. Definite announcement was not made, but reports are that actual sales were quite satisfactory to the exhibitors.

**CLETRAC PRICE REDUCED**

Cleveland, March 13.—The Cleveland Tractor Co. has reduced the price of Model F Cletrac from \$795 to \$595. The new price is effective immediately and furnishes the tractor complete.

**WINDSHIELD CLEANER REDUCED**

Cleveland, March 13.—The Folberth automatic windshield cleaner price has been reduced from \$10 to \$7. It is made by the Folberth Auto Specialty Co.

## BUSINESS NOTES

Karl Brothers, Fairfield, Conn., dealers in motor vehicles, has been incorporated, according to papers filed with the secretary of state, with an authorized capital stock of \$50,000. The incorporators are John M. Karl, Stephen E. Karl, Joseph A. Karl and Leo E. Karl, all of Fairfield.

Bluffton-Huntington Buick Co., Bluffton, Ind., entertained factory branch officials and executives of Buick stores in nearby counties at dinner recently. Thirty were present. Improved business in this part of the state was generally reported.

Sioux Falls Automobile Association has been formed, with \$5000 capital. The incorporators are G. C. Redfield, D. L. McKinney and John P. Bieeg. The next automobile and industrial show will be April 5-8 in the Coliseum.

Heiss Tire Co., Sioux Falls, has been incorporated with an authorization of \$100,000 capital by accessory men, H. F. Brownell, M. C. Heiss and H. H. Brownell.

Willis-Overland Co., Minot, N. D., will open a factory branch here, to serve the territory west to the mountains. L. C. Stearns is named branch manager.

George W. Nock Co., Philadelphia, has been appointed distributor for "Instant-Pep-Co." piston rings.

Kearns-Dughe Motor Corp., Danville, Pa., has announced new prices for its different truck models.

R. M. Kaough & Co., Ft. Wayne, Ind., automotive jobbers, have begun remodeling operations on a building adjoining their present quarters.

Federal Rubber Co., Philadelphia, manufacturer of Federal tires, has opened a distributing warehouse to serve this city and adjacent territory which will not depend, as heretofore, upon New York and Richmond as distributing centers.

George B. Tillinghast, owner of a garage at Buffalo, will erect a \$50,000 addition to his service station this spring, giving the building a storage capacity of 225 automobiles and making it one of the largest in Buffalo.

McCord-Harris Co., Columbus, Ohio, central Ohio distributors for the Chandler and Cleveland, has moved from its old location to larger quarters. Under the new arrangement the service department is located with the sales rooms.

Glenn W. Tisdale, president of the Automotive Merchants' association of New York, was the principal speaker at the March meeting of the Automotive Service association of New York.

Empire Sales Co., Bridgeport, Conn., a new local concern for the manufacturing of automotive accessories, has recently been incorporated to handle hub caps, tire valve cores and cylinder priming pet cocks. The concern will handle the sales end, production of the orders being left to the Grant Mfg. & Machine Co., of this city.

Brill-Saunders Machinery Co. has been incorporated at Appleton, Wis., with \$150,000 capital to manufacture and deal in all kinds of machinery, tools, etc. The incorporators are Sam R. Saunders, Edward Brill and Walter Blake, all of Appleton.

Seamweld Equipment Co., Milwaukee, Wis., has changed its corporate title to the Fred Pabst Co.

Atlas Drop Forge Co., Lansing, Mich., paid a 50 per cent stock dividend and a 25 per cent cash dividend in February, the dividend being in reality the distribution of a surplus which has been accumulating over a period of eight to 10 years. The dividend action is taken as an indication of assured business conditions for many months to come.

Motor Truck Service Co., Milwaukee, which recently has become state distributor of the Columbia Six, has changed its corporate title to The Columbia-Wisconsin Co.

Parenti Motors Corp., of Buffalo, N. Y., has opened a factory branch at Philadelphia. W. E. Raymond, general sales manager, is located here for the present and L. J. Carry, in charge of the Philadelphia headquarters, will be here permanently. Branches and dealers are to be established throughout eastern Pennsylvania, New Jersey, Delaware and Maryland, with Philadelphia as the distributing point.

Auto Parts Co., Peoria, Ill., has broken ground for a new building, to cost \$18,000. Expanding business has made necessary a new and larger plant. It will be ready for occupancy May 1.

Davis Headlight Co., Virden, Ill., organized one year ago for the manufacture of a new type of headlight for motor vehicles, and with a capital stock of \$10,000, has dissolved and the charter has been surrendered. E. G. Gordon was president and E. R. Riedle secretary. Too much competition and difficulty in interesting manufacturers of cars led to the decision to dissolve the corporation.

World Tire Stores Corp., which is now opening a chain of stores in central Illinois, has selected El Paso, Wenona and Minonk, for such branches.

Batavia Rubber Co., Batavia, N. Y., tire manufacturers, will open a chain of retail stores through which it will distribute its output, according to an official announcement of Ernest W. Kling, general manager of the company. The first stores will be opened in Batavia and Lockport, N. Y.

Fedders Mfg. Co., Buffalo, purchased the former Lautz Marble Works plant in Bridgeburg, Ont. The plant will be refitted and radiators will be manufactured there.

Adria Motor Car Co., Batavia, N. Y., announces that it has met the demands of its creditors and has resumed production after a month's suspension.

C. H. Wills & Co., Marysville, Mich., has appointed six new distributing organizations and a considerable number of new dealers for Wills Sainte Claire motor cars.

Henry A. Poppert & Sons, brass and aluminum founders, and H. A. Poppert & Co., pattern-makers, occupying joint quarters in Milwaukee, have been incorporated under the name of Henry A. Poppert & Son Co., with a capital stock of \$50,000. The incorporators are Henry A. Poppert and Russell L. Poppert and Jacob J. Poppert.

C. W. Dickover Mfg. Co. has been incorporated at Tomah, Wis., to manufacture garages and repairshop equipment of all descriptions. The capital stock is \$25,000 and the incorporators are Charles W. Dickover, Alex M. Henry and Earl W. Henry, all of Tomah.

Cooper Auto Sales Co., Middleport, Ohio, has been chartered with a capital of \$50,000 to deal in automobiles, trucks and supplies. Incorporators are R. V. Ebersbach, Frederick Ebersbach, H. E. Cooper, Edna B. Cooper and Mildred Ebersbach.

Cleveland Hammered Piston Ring Co., Cleveland, Ohio, has been incorporated with a capital of \$110,000 to manufacture piston rings and other auto parts. Incorporators are Henry F. Grayn, R. A. Gillie, Agnes Kent Strong, Corrine Allhouse and Ralph W. Edwards.

Motor Parts Machine Co., Cincinnati, Ohio, has been chartered with a capital of \$25,000 to manufacture parts for passenger cars and trucks. The incorporators are Raymond E. Wood, H. S. Elliott, Ruth Wood, Chester R. Shook and Rolland L. Kraw.

Bingham Mfg. Co., Columbus, Ohio, has been incorporated with a capital of \$100,000 to manufacture special parts for trucks and to assemble trucks. The company has taken over the plant of the Immel Co., large body makers, which went into the hands of receivers some time ago. H. N. Bingham is president and general manager; F. E. Kocher, vice president, and G. P. Hinkle, secretary. Other incorporators are J. A. Shearer and James R. Spellman.

Woodland Tractor Co., Columbus, Ohio, is the name of a new company, chartered with a capital of \$15,000 to distribute the Cietrac line of tractors, made in Cleveland. The sales room and service station is located at 539 North Park street. J. E. Woodland is president and general manager; W. J. Southwick, vice president; E. S. Heminger, secretary, and S. W. Deming, treasurer.

O'Neil Oil & Paint Co., Milwaukee, for 28 years engaged in the wholesale gasoline, oil, paint and varnish business, has made a number of important changes in its organization. The chief change is the acquisition of J. M. McLaughlin as vice president and director of sales. McLaughlin, for the past three years, was general manager of the Wisconsin Cabinet & Panel Co., of New London, Wis., the largest woodworking unit of the Thomas A. Edison industries group. John T. McDermott, formerly auditor with the Edison company, assumes the same position in the O'Neil organization. George F. O'Neil remains as president and general manager; James S. Notter, Thomas F. Hyde and A. F. Schroeder, vice presidents; Edward Pfleger is the new treasurer, and Arthur C. Franz the new secretary.

The Evansbilt Battery Co., Waltham, Neb., is putting on the market a battery of new design, and for which the makers claim many unusual features.

R. & V. Knight Motor Co. has opened a retail branch in Moline, Ill., and R. N. Ward has been placed in charge. The new branch is located across the street from the factory in East Moline, a modern plant being constructed for the housing of the new department. It is planned to take care of the retail service department in connection with the sales agency. D. S. Smith is to be in charge of the latter.

## Guaranty Trust Says Car Prices Reach Stabilization

49 Makes Show Reduction of 22% While Some Others Are as Much as 42½

NEW YORK, March 14—The Guaranty Trust Co. in discussing automobile prices in its monthly survey states that "approximate stabilization of automobile prices is believed in the industry to have been definitely reached."

It then goes on to say: "The average price of 49 of the principal standard touring car models is now 22 per cent below the average price on Sept. 1, 1920, but the price of the greater quantity of cars sold represents a much greater reduction, some as much as 42½ per cent. This reduction has been brought about by a series of price cuts spread over more than a year, so that we now stand at what appears to be the end of the period of price revision rather than at the beginning. In view of known improvements and refinements in the product, no comparison of present prices with those of 1913 is possible or significant."

"This conclusion in regard to stabilization is based not only upon the amount of the average price reduction that has taken place, but also upon the progressively smaller price cuts made recently by leading manufacturers. Furthermore, at least six manufacturers have raised their prices since the first of the year, and there is justification for the belief in an apparent stabilization of the costs of the chief materials entering into motor car manufacture. Many people believe that the prices of raw materials entering into the manufacture of automobiles have reached bottom. In the case of some of these materials a renewal of the upward price trend has been manifested. The average price of metals and metal products is now nearer the 1913 level than that of any of the nine groups, except farm products, for which the Bureau of Labor Statistics compiles price data. It appears, therefore, improbable that automobile production costs can go materially lower for some time."

"Inventories have been well liquidated in the automobile industry and the industry brought to a sound position, where no justification of further general price reduction appears to exist."

## TIRE DEALERS SALES WEEK

Cleveland, March 14—The Cleveland Retail Tire Dealers' Assn., entertained 150 retail tire dealers of this city at a dinner and smoker in Hotel Winton recently.

The members of the association have under way plans for a better merchandise week, during which period tire buyers will be posted on the values offered in standard brands.



# The READERS' CLEARING HOUSE

## Questions & Answers on Dealers' Problems

### INFORMATION ON FORMING A LOCAL TRADE ASSOCIATION

**Q**—Will you please send me information and plans for organizing a local trade association, having as its members garages, repair shops, tire dealers, battery stations and other branches of the automotive trade? We want mutual collection systems and suggestions on closing hours, copy of regulations and by laws governing trade bodies.—MacDonald Brothers, Battery Service Station, Brazil, Ind.

We are very glad to offer you any advice or assistance that we can in an effort to organize a local trade association in your community. You have, of course, quite a complicated question when you attempt to bring into a single association all the interests that are involved in the service of an automobile, in a city the size of Brazil, Ind.

However, we think this can best be done through following the lines of organizing through the service associations. We believe that you would get the best information of this sort by writing to Alfred Reeves, general manager of the National Automobile Chamber of Commerce at 366 Madison Ave., New York City.

The National Chamber has a service department which has assisted in organizing many local service associations. We are quite sure that Mr. Reeves will be very glad to direct the service department of his organization to send to you the plan they have for such work.

It might be worth your while to communicate, too, with L. M. Shaw, general manager of the Indiana Automotive Trade Assn., 388 North Delaware St., Indianapolis, Ind. It is very likely that Mr. Shaw will be able to give you some personal assistance in forming your association.

### GARAGE LAW IN ALABAMA

**Q**—Will you please tell me the law on garages in Alabama? What is the law on using a stationary gas engine within the city limits of Birmingham, Ala. The place where I want to build is in the suburbs and there is no power there, so I want to use a gas engine until I can get up enough trade to move in town. This place is a good location. It is on the main highway. I am going to build an electric service station and a tire repair shop to start with. Also tell me what the license on a place like this will be.—M. L. Haynes, Stone Wall, W. Va.

In Alabama the garage man is taxed a license fee of \$75.00 for each garage where a charge is made for storage of motor vehicles, in all cities of 100,000 inhabitants. In such cities he is charged a license fee of \$100.00 for each garage for the repair of motor vehicles. And if he desires to deal in automobiles he is taxed \$125.00 in counties of 100,000 or over and he may not sell outside the county.

### The Readers' Clearing House

**THIS** department is conducted to assist dealers and service station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of *MOTOR AGE* is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert and P. L. Dumas; Legal, by Wellington Gustin;; Paint, by G. King Franklin; Architectural, by Tom Wilder; General Business questions, by *MOTOR AGE* organization in conference.

If he operates an automobile filling station in connection he must pay a state license fee of \$5.00 for each station where only one pump or filler is used, and where more than one filler or pump is used \$20.00 for each additional pump or filler used. If he deals in accessories he must pay \$60.00 for the privilege. These fees are less in cities and towns or counties of a smaller population.

Otherwise the laws governing garages in Alabama are the general laws of business.

You will have to refer to the city ordinances of Birmingham to learn if there are limitations on the gas engine you propose to use, within the city limits. One of the bureaus of that city's government will give you the information desired.

### GASOLINE TANKS IN CITY

**Q**—In the operation of our filling station here, we have been put to a great deal of inconvenience by the fact that we are forced to buy our gasoline in tank wagon quantities.

We purchased ground along the railroad right of way on which we started to set two 10,000-gallon storage tanks. This ground is in the city limits and is alongside of some warehouses.

We had no sooner started work on the erection of those tanks until twenty-four property owners in that section of the city enjoined us from storing gasoline in the tanks. We failed in our first effort to break the injunction and the case has now been set for trial in the district court.

Not being familiar with Oklahoma law

we would greatly appreciate anything you might have in regard to the same. We enclose a self-addressed, stamped envelope for reply.

If we win this case what sort of damage suits would we have against the plaintiffs and what chance do we stand to win?—Auto Supply & Service Co., Blackwell, Okla.

In *O'Hara vs. Nelson*, a New Jersey case, found in 63 Atlantic R. 836, is an instructive treatise on the subject of gasoline as a nuisance and its dangers. This was an opinion of the court on the question "whether in a thickly built up portion of a large city—particularly where there are numerous frame buildings—parties may store and use so dangerous a substance as gasoline in such large quantities that an explosion thereof would cause serious injury to the adjacent property and be a serious menace to the lives of those in that vicinity."

A preliminary injunction was granted and later, on second hearing, it was made permanent, 71 N. J. E. 629. This opinion, however, passes on facts somewhat different from your own, and the garagekeeper was enjoined from filling automobile tanks within the building which was frame and adjacent to other frame buildings.

The volatile quality of gasoline has been decreased within recent years, so that it is now not much removed from kerosene and will not vaporize in cold weather. So, while formerly, it was included as a dangerous agency and a nuisance per se, the courts are now more generally holding it is not a nuisance per se as used in and around garages. In the case cited above it is said, "whether they are or are not nuisances depends upon the locality, the quantity and the surrounding circumstances, and the method and manner of keeping and use."

In *Ganigan vs. Refining Company*, 40 Atlantic R. 834, it was held that gasoline in tanks located within the limits of a city, where adjoining lots were closely built upon, was not a nuisance per se, but the owners of the tanks were held to diligence in protecting the public from injury or discomfort therefrom. This appears to be good law.

If you have no city ordinance regulating the storage of oil, then, whether your tank would be a nuisance is a question of fact from all the surrounding circumstances. From your brief statement these appear to be in your favor.

While one may use his property or land for any lawful purposes, erecting or maintaining thereon anything not in itself a nuisance, still he is chargeable with any negligence in relation thereto. One writer says negligence is the absence of care according to the circum-

stances, and the dangers incidental to the use of gasoline being manifold in an unusual degree, slight omissions of care will weigh heavily against the offender. So without more facts, we are of opinion you may not be permanently enjoined from building as proposed and begun.

If there is but a preliminary injunction now against you, without a trial in the merits, and you are able to win your case on trial and this injunction is dismissed or dissolved, then you should be able to recover on the bond put up by complainants for all the damages occasioned you.

## Advice on Planning Garage and Service Station

### PLAN 372

I am enclosing a sketch of a garage and service station which I am considering building and would like if you could furnish me with some drawings along these lines, or perhaps you may have something in mind that will fill my needs to better advantage.

The service station is to be in a town of about thirty thousand people in the state of Ohio, some thirty miles from Dayton.

My idea is to build and maintain a first class service garage, equipped with the latest machinery, for all cars and eventually take on one or two agencies.

The ten foot wall around the shop was put there to cut off the view from the main service floor and at the same time allow all the circulation of air possible.

Have you any means of obtaining the approximate cost for the structure made of hollow tile stucco facing on front and one side, cement floor, hardwood flooring 45 ft. back from front, complete, less garage equipment.—Roy Hasselback, Detroit, Mich.

Your layout is very good in its general arrangement and we are making suggestions only on a few details which we think you might improve.

In your garage the car spaces are shown only about 10 ft. long while the smallest cars use 12 ft. and large cars require 16 ft. In view of this it would be more efficient to store cars along both sides than at one side and one end.

Access to the office, etc., may be retained by so placing a curb that there will always be a passage left behind the cars.

The space allotted to general office is too small for a building of the size you contemplate; it could be enlarged to quite an extent at the expense of the private office, women's room, etc., the passage need be only wide enough to get a car through easily.

You must be careful in placing your gasoline and oil station to so arrange it that cars will not block the entrance and exit. The air would be better outside or at some other point so that motorists seeking free air will not interfere with gas sales. By making the exit wide cars stopping for gas will not block it. We have indicated the probable course of cars around the pump and with three ordinary positions in taking on gas

there is still passage way for a car leaving.

We will make no criticism of the shop, but believe the space allowed for accessories too small to give sufficient stock-room space. If you plan to keep accessories elsewhere the space is ample.

You might also take 5 ft. from the washrack and add it to the machine room. It would still be plenty large for 3 cars and furnish storage for 4 cars when not in use for washing.

As to the cost of this building we can only make a rough estimate as much depends on the material and labor situation. A minimum cost would be \$40,000 and a maximum would be \$60,000 or even more. In Chicago or any other large city the cost would be \$70,000.

The low wall around the shop is well in summer but not so desirable in winter. Then you will want to conserve the shop heat while the garage may be only a few degrees above freezing, 40 perhaps. Walls extending to the roof with sections that could be opened in summer would be better.

### VALUABLE ESSEX INFORMATION

Following are a few suggestions on W. M. Hicks, question No. 4, Readers' Clearing House.

Mr. Hicks writes that he has noticed a number of Essex cars that spit back through the carbureter when on a hard slow pull, and that he has remedied the trouble by cleaning the distributor.

Would suggest that Mr. Hicks' trouble could be remedied first as the Editor has shown by securing a test set of high grade plugs set at the proper clearance; second, by removing piston from air chamber and polishing same very highly with a good metal polish, also polish surface of air chamber before replacing piston. While piston is out of chamber take a very small three-cornered file and make the groove in the metering pin a little longer.

A piston that sticks in the air chamber will seriously interfere with the action of the carbureter at the same time if the packing gland is loose it will permit excessive gasoline consumption with its attendant troubles.

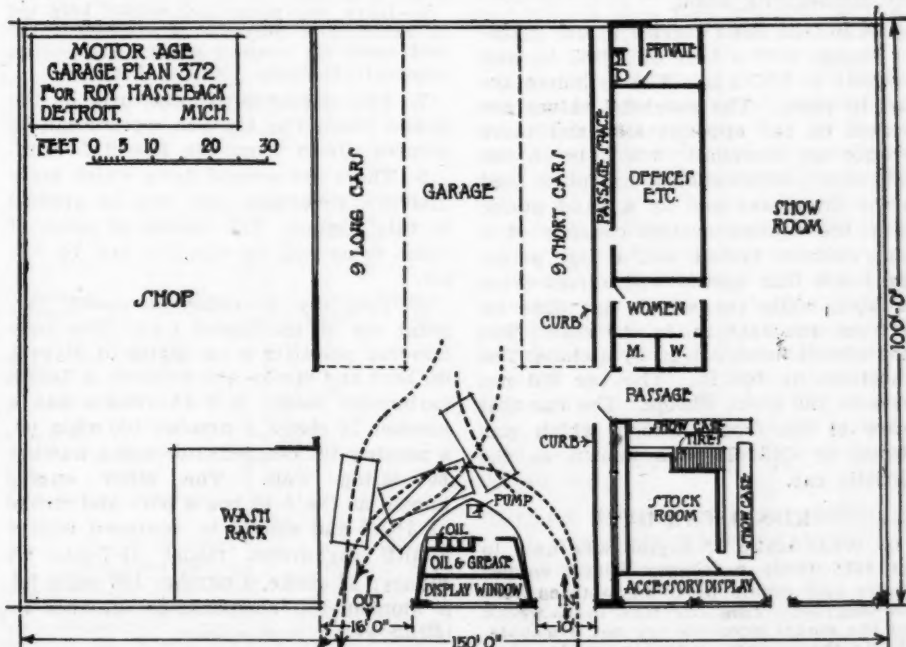
Third, a retarded flow of gasoline into the carbureter usually caused by some foreign matter will cause spitting back into the carbureter. I have had the same trouble with the earlier models and find that by going over the carbureter I have obtained good results.—C. A. MacGowan, Hartford, Conn.

Note—We wish to thank Mr. MacGowan for this valuable information. All of the remedies suggested are logical and no doubt will prove of great benefit to those engaged in the servicing of this make of car.

### CALCULATION OF TAXABLE HORSEPOWER

Q—Give the taxable horsepower on the Marion-Handley 6-10 1917 automobile. The book from which my license was estimated by county official calls for 40 h. p. but the book I looked it up in (this is model 25 Rutenber motor) says 23.43 h. p. Would this not be higher priced for the license when rated at 40 h. p. and would this not be more than any American made car?—Paul Miner, Breckenridge, Texas.

The 40 h.p. used by county official is apparently the advertised horsepower which the engine probably develops, this figure always being mentioned in advertising literature and when selling the car. The technical rating according to the law for purpose of taxation is based on the S. A. E. rating that the horsepower is equal to the diameter of the cylinder multiplied by itself and then divided by  $2\frac{1}{2}$  then multiplied by the number of cylinders. As the diameter of the cylinder is  $3\frac{1}{4}$  ins. the horsepower figures out 23.43 in accordance with the figures you obtained from the Rutenber instruction book and this lower figure is the one on which you should be taxed.



Plan 372—An unusual arrangement of gasoline pump just inside a double entrance with accessory show window between



### WIRING OF 1914 CADILLAC

Q—Publish wiring diagram of Delco system on 1914 Cadillac showing internal wiring of generator.

2—Could a Heinze-Springfield cut-out regulator be used as a voltage regulator in lieu of the mercury well? If so, how could connections be made?

3—Advise why the 3rd wire on Gray & Davis generator as used on a 1913 "R" Velle.—French & West Garage, A. W. West, Wanette, Okla.

1—This diagram is shown in Fig. 1.

2—We have no data on the Heinze-Springfield cut-out. It is possible to replace the mercury regulator with a regular Delco reverse current relay. The necessary connections are shown in at "a" and "b", Fig. 1.

The installation cannot be made until the generator has been equipped with a reverse series field winding. This winding can be installed by the Delco factory or any of its official service stations. The internal connections of the system as originally installed are shown at Fig. 2. The connections on the sliding switch type of 1914 Delco motor generator for installation of the vibrating relay type of regulator are shown at Fig. 2. The installation connections to be followed when applying the relay regulator to the shifting brush type of motor generator are shown at Fig. 3.

3—This generator is a governed speed type when running as a generator to charge the battery only the current is drawn from the shunt field, but through the medium of the third connection on the generator the series winding is cut in in connection with the shunt winding strengthening the magnetism and increasing the output.

### BLITZEN BENZ DESCRIBED

Q—Is the Blitzen Benz which was driven by Oldfield and Burham, which held the world's records for quite a long time, front wheel drive or rear wheel drive? Describe the car especially the way it was driven at the time those two men set the records at Daytona Beach.—Chester McKee, Minneapolis, Minn.

The Blitzen Benz carried a four cylinder engine with a bore of 7.2835 in. and a stroke of 7.8741 in. The cylinders are cast in pairs. The overhead valves are located on the opposite side and there is only one camshaft which is on the right side. Lubrication is by splash feed in the crankcase and by a hand pump, while the cooling system consists of a Benz radiator system and a gear pump. There are four speeds with direct drive on high, while the wheels are 32x4 in. in front and 34x5 in. in the rear. The rear wheels being driven by a chain. The wheelbase is 108 in. The car did not drive to the front wheels. The car that drove to the front wheels which was owned by Oldfield was known as the Christie car.

### KISSEL CAR DATA

Q—What make of engine was used in the 1918 three passenger Kissel coupe? Where can repair parts be obtained for this engine? This car was in a wreck and the model numbers are not available.

2—Is there any governor made that could be used on this engine, if so, what make and where can it be purchased?

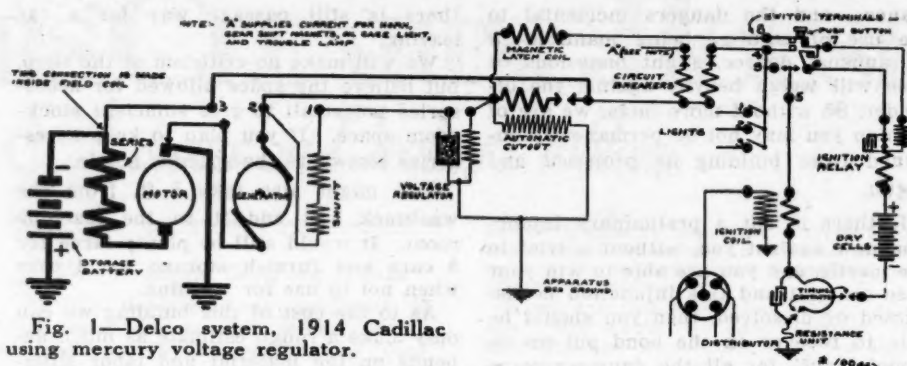


Fig. 1—Delco system, 1914 Cadillac using mercury voltage regulator.

Fig. 2—Delco sliding switch type of motor generator.

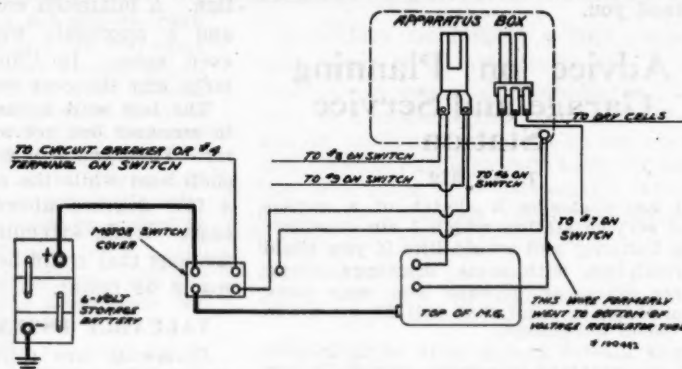
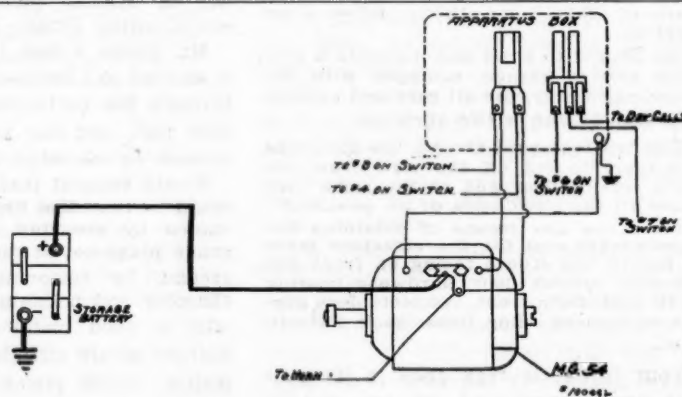


Fig. 3—Showing connections for regulating relay installation on 1914 brush shifting type motor generator.



3—Would this engine start easily with a Dixie magneto, and should I use an impulse coupling?

5—Have you plans that would help me in building a portable power outfit for belt work for cutting wood and shelling corn?—D. H. Kelly, Orvillia, Iowa.

1—This engine is manufacturer by the Kissel Motor Car Co. and repairs can be secured direct from the Kissel factory.

2—There are several firms which manufacture governors that can be applied to this engine. The names of some of these firms will be supplied you by letter.

3—This car is either a model 100-point six or the model 6-42. The one-hundred point six is an engine of 3½x4½ in. bore and stroke and requires a Zenith carburetor model E-T-4A, which has a number 21 choke, a number 100 main jet, a number 105 compensator and a number 60 idling well. The other engine known as the 6-42 has a bore and stroke of 3½x5 and should be equipped with a Zenith carburetor model H-T-5A. A number 21 choke, a number 100 main jet, a number 110 compensator, number 50 idling well.

4—We would recommend that you install an impulse starting coupling on this

engine. It will greatly facilitate starting.

5—We have no plans for the construction of such an outfit as you mention. Would suggest that you communicate with some of the well known farm journals who no doubt will be able to supply this information.

### GEAR RATIO OF 1920 ROAMER

Q—What is the gear ratio of the Roamer four passenger touring serial No. 183422, engine No. N39779?

2—How can we speed up this car?

3—Will it handle a 3½ gear?

4—Where can gears for this car be obtained?—E. W. Vincent, Sterling, Colo.

1—3.84 to 1.

2—This engine can be speeded up by following the numerous suggestions offered to owners of Continental engines. They include raising the compression, lightening all reciprocating parts, such as pistons and connecting rods, advancing the ignition and a general lightening up and balancing of all moving parts.

3—Yes. If not used in parts of the country where hills are frequently encountered.

4—This will be answered by letter.

## OLDSMOBILE USES OWN ENGINE

**Q—Where can I secure a book on Real Practical Automobile armature winding? A book which will cover it very thoroughly.**

2—Tell what the torque should be on different motors.

3—What advantage has third wire in lighting system on Franklin? Publish wiring diagram.

4—How do you tell the difference between 6-volt and 12-volt motor generator with all markings removed?

5—In your list of passenger cars you list Oakland and Oldsmobile six with their own engines. I am told that these are Northway engines.

6—What is the valve setting on Northway engine in degrees.—A. Reader, Cleveland, Ohio.

1—This question will be answered by letter.

2—This information is given in the high grade Automotive Electrical Wiring Diagram books or service manuals. When it is not given in these books it can be secured from the manufacturer, or through the Readers' Clearing House in MOTOR AGE. The names of firms supplying these books will be sent you by letter.

3—This is done to secure the necessary switch connections for the double bulb headlight two-wire system. The wiring diagram is shown in Fig. 4. This diagram is to be used for cars with serial number of 24613 and after.

4—There is no positive way to determine this unless the machine in question is put to a test for ohms resistance based on the wire size.

5—The engine in Oakland and Oldsmobile cars listed as their own because the Northway Motor Co. and the Oakland and Oldsmobile Motor Car Companies are units of the General Motors Co. and are therefore listed as using their own engines.

6—The timing of the Northway as used in the Oldsmobile model 37 is as follows: Inlet opens 17½ degs. after upper dead center, inlet closes 38 degs. after lower dead center. Exhaust opens 42½ degs. before bottom dead center, exhaust valve closes 7½ degs. after upper dead center. The correct timing for the Oakland is as follows: Intake opens after upper dead

center  $17\frac{1}{2}$  degs. Intake closes after lower dead center 36 to 38 degs. Exhaust opens before bottom dead center  $42\frac{1}{2}$  degs. Exhaust closes after upper dead center  $7\frac{1}{2}$  degs.

## REMOVING LIME DEPOSITS

**Q—**What is your opinion of the Thermol engine that Sears, Roebuck & Co. sell? We want an engine for charging batteries and expect this engine to run ten hours daily and keep it up. Will this engine do it?

2—What will remove lime from the hopper of a water cooled engine? This lime is about  $\frac{1}{8}$  in. thick over cylinder and hopper walls.

3—How can a crystallized axle be detected, for instance one axle shaft breaks in a Ford and how can you tell whether the other axle shaft is ready to be replaced by a new one, as there are many times that the old axle shaft was left in, will break, and then the mechanic that did the job will get the blame?—T. E. Thompson, Newman, Ill.

1—We have no data concerning the Thermoil engine but believe that this firm's reputation for fair dealing would insure that you would get satisfaction from any article purchased from them. Regarding the reliability of the engine we know nothing other than they have been sold in large quantities by this company.

2—You state that this is a hopper cooled engine. The quickest and most thorough method to remove the lime from this engine would be to use a cold chisel. Deposits of lime where they are inaccessible to tools such as cold chisels can be softened somewhat by the use of muriatic acid or the various solutions of Oakite.

3—There is no definite way to detect a crystallized axle unless the person is equipped with very extensive equipment. The only test possible to give a shaft in the average garage is to examine it carefully and if it shows no external defects it could be considered as being a perfect shaft. A good method to pursue in replacing one axle shaft is to convince the owner that the opposite axle shaft should be replaced, automatically relieving the mechanic of any undue blame.

## KNIGHT EXPERT DISCUSSES MAINTENANCE OF KNIGHT ENGINE

Please pardon my presumption in questioning your verdict published in your Jan. 12 issue. From what experience I have had with Knight motors, and it is not inconsiderable, I would suggest that Mr. Fred Beach check the timing on his Willys-Knight, especially the eccentric shaft timing. It is possible that in 35,000 miles driving, it has been necessary to install a new eccentric chain. And, while a Knight motor will run with from one to three teeth out of the road, it is not apt to be very satisfactory.

In the second section of your answer you repeat the time-worn injunction, "Do not remove carbon of gummy oil from behind the junk rings." Supposing you find a motor that, in course of time, has accumulated heavy deposits of very hard carbon behind the junk rings and, on removing the heads, the springing action of the rings dislodges particles of hard carbon at the top of the ring slot, the same dropping down and holding the ring in its open or expanded position.

How would you propose to put that head back? I have seen so-called mechanics replace heads that were so tight that it was necessary to use a heavy mallet to drive them down after they had been forcibly started into the inner sleeve.

Such practice often results in broken junk rings and ruins sleeves. I would not remove a particle from behind junk rings unless absolutely necessary. And, in the same connection, I might add that I would not hesitate to remove any or all of it before I would resort to force in order to replace the head.

Carbon behind junk rings can be built up very rapidly, by introducing cylinder oil into the combustion chamber after the engine is well warmed up, through the priming cocks on the intake manifold, while the engine is running, say, about a teaspoonful once a day for the first four or five hundred miles after the engine has been overhauled. This means one teaspoonful per cylinder.

Careless and ignorant handling of Knight engine by repair men who are not thoroughly conversant with them, has resulted in more Knight failures than can be charged to any other one cause. There seems to be a superstition among buyers that, "if you get a good Knight, you are in luck." The whole truth of the matter is that, unless a Knight motor can be serviced by competent mechanics who are in sympathy with the Knight principle, that Knight runs best which is serviced least. I am sir, John A. Forgrave, Helena, Ohio.

Note—We are printing above letter because it is both interesting and instructive. Mr. Forgrave states that Mr. Beach should check the timing of his Knight engine. If the question submitted by Mr. Beach is carefully read you will note that the last sentence is as follows "Timing is all right." The answer was given on the presumption that Mr. Beach referred to the timing of both the valves and the ignition. We heartily agree with Mr. Forgrave in his views regarding the removal of carbon from the junk rings, although we doubt whether any reasonable, thinking mechanic would install a head where he had to pound it down into the sleeve.

## READER WANTS BOOK ON STORAGE BATTERY MAINTENANCE

Q—Advise where a book on storage battery charging, rebuilding, etc., can be purchased.—W. E. Blumentritt, Mound Prairie, Minn.

The names of firms supplying these books will be sent you by letter.

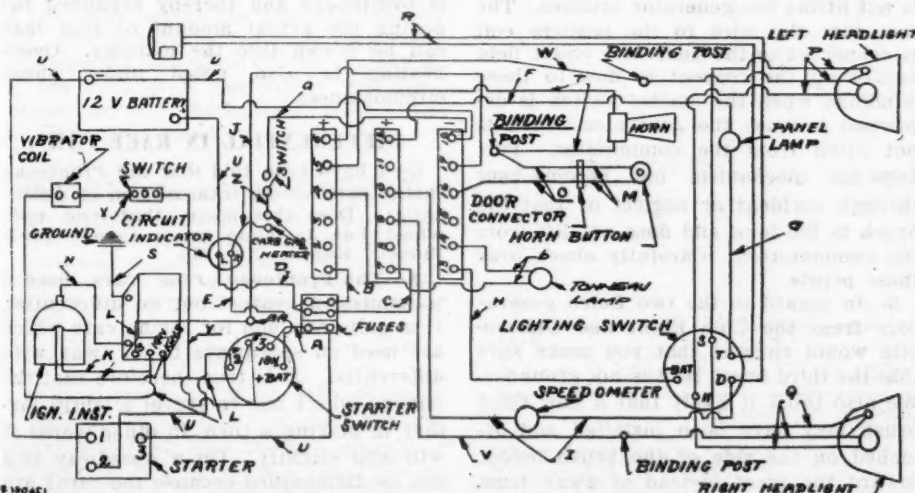


Fig. 4—Wiring diagram of Franklin cars after Serial No. 24613



## Principle of Oscillator Magneto

Q—Explain the principle of the low tension oscillating type magneto as used on some stationary engines. Webster for instance. What should be the amperage draw to the field windings other than renewing the armature bearings and recharging the magnets, what else can be done to make this car produce a good hot-spot?

2—We have an Oakland car 1917 model with Delco single unit equipment which gives trouble when, with the ignition switch engaged, the starter will hardly turn the motor, but if we release the ignition button the starter whirls the motor very rapidly. With either generator brushes lifted off the commutator it will operate. Give remedy for this.

3—We recently had two Delco generators shipped to us from the Cole Eight company and an Oldsmobile that charged at a very high rate. We lengthened the third brush slot as far as possible, but this only brought the charging rate down to about 15 amperes. Everything tests alright. What causes this and is it possible to insert a resistance in series with the field to help cut down the output. Are there any other remedies?—Kimball & Bierman, Holdrege, Neb.

1—There are two forms of low tension magneto systems. One where the armature of the magneto revolves continually and current is taken off the same way as it would from a dynamo. In the other form the armature of the magneto is revolved through about  $\frac{1}{4}$  of a circle by releasing the spring attached to a lever on the armature and at the same time the igniter points in the hammer break type of igniter are separated.

The oscillating system is shown in Fig. 5, in which at "I" is shown the magneto at the left with the permanent magnets "B" in a movable shield "C" which revolves between the armature and magnet poles "D." The rod "H" in the position as shown separates the igniter points indicated by dotted lines.

As the proper time for ignition approaches a dog "K" on the camshaft comes in contact with the lever "L" which is attached to the shield "C." Referring to diagram, the cam "K" has swung the lower end of the lever "L" to the left and with it the shields "C" against the resistance of the large spring "SS"; at the same time the rod "H" is then drawn to the left, allowing the spring "S" to draw the movable electrode on the inside of the engine. The moment after the lever "L" slips off the end of the dog "K" the spring "SS" pulls the lever back into the position shown in "I" and the shield revolves to the left generating a momentary current by breaking the lines of magnetic force passing from poles "C" to the armature "A."

This answers the same purpose as moving the armature "A" through the same arc as already referred to. The maximum current is generated just as the point of the shield passes the corner of the rocker arm "G" separating the igniter points on the inside of the engine. The two working together cause the break to be made at the point of the highest electrical pressure and an intensive spark results.

This system which is modified more or

less according to the maker is in extensive use on large stationary engines. We have no figures on the amperage draw of the field windings. If the magnets were charged and the magneto overhauled completely the trouble is due to improper setting of the armature. The arm which oscillates the armature should be so set that the make and break points in the engine separate at the point where the armature gets the peak of the electrical current, this is shown in the diagram.

In most magnetos of this type this position is approximately  $\frac{1}{4}$  of a revolution past the point where the armature will assume a position naturally.

2—This condition is due to trouble in the mechanical switch. The mechanical starter switch utilized on this generator opens the generator circuit and allows

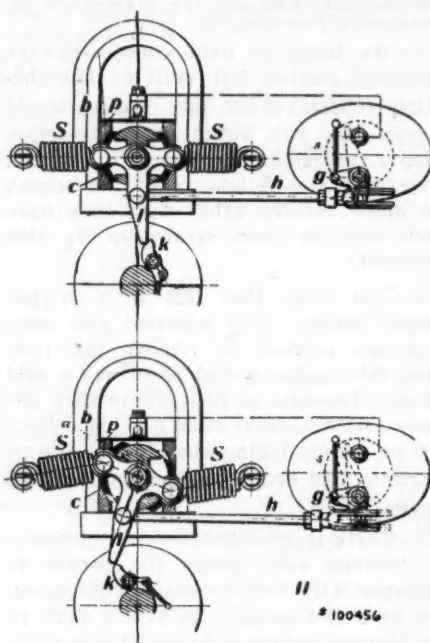


Fig. 5—Typical oscillating type magneto

the motor brushes to come in contact with the commutator closing the starting circuit to crank the engine.

It should lift the generator brush at the same time. In your case this switch is not lifting the generator brushes. The fact that the wire to the ignition coil is connected to the generator shunt field causes all the current to flow to these windings when the starter switch is depressed because the generator brush is not lifted from the commutator. Perhaps the mechanism has become bent through accident or neglect or that the brush is too long and does not lift from the commutators. Carefully check over these points.

3—In regard to the two Delco generators from the Cole Eight and Oldsmobile would suggest that you make sure that the third brush lead is not grounded. We also think it likely that a new third brush may have been installed and attached on the side of the brush holder toward the pivot instead of away from the pivot.

This would have the effect of increasing the output and we would therefore suggest that you check this and make sure that the brush is installed on the side of the brush holder away from the pivot, also making sure that the brush has been carefully sanded so as to have a good bearing on the commutator. The use of a resistance is of course possible but we do not believe that it should be required if you have carefully checked the points above mentioned.

## READER SEEKS ADVICE ON FOUR SPEED TRANSMISSION

Q—Would you advise installation of four speed transmission on Ford touring car? Is installation difficult?

2—What is wrong with a Ford Holley carburetor when best mileage obtainable on long tours is only 12 miles per gallon, although mixture has been set as lean as possible and still have engine run properly. Engine appears to have plenty of power.

3—Would you recommend installation of combined inlet and exhaust manifold on Ford car during the summer months? Would they save an appreciable amount of gasoline? Give details.—Roman F. Penkert, New Elm, Minn.

1—This will be answered by letter.

2—In the Holley carburetor which gives poor mileage it is possible that the jet is worn so that accurate adjustment is not possible. It is also possible that this is an old style Holley which is not suitable for present day fuel. Since 1919 the Holley carburetor has been using a different size nozzle which is more suitable for the fuel being used today.

It is quite likely that there is some other trouble on the car which accounts for the low gasoline mileage, for example, a slight leak at the tank or sediment chamber even though only enough to keep the outside surface of the sediment chamber wet will nevertheless cause considerable loss of gasoline. It is also possible that while the engine runs fairly that the compression is not what it should be due to possible leakage past piston rings or poorly seated valves which may account for excessive consumption of fuel.

3—The combination inlet and exhaust manifold, while very helpful in winter is not suitable for the car in summer as the gasoline vapor entering the cylinder is overheated and thereby expanded reducing the actual amount of fuel that can be drawn into the cylinder. Overheating is also noted under these circumstances.

## DIFFERENTIAL IN RACE CAR

Q—I have been told that the Frontenac racing cars use no transmission or differential. Does this mean that one rear wheel has to slide on a turn?—Davis Bumett, Kansas City, Mo.

A—The Frontenac race cars used a transmission gearset but no differential. It is quite common for racing cars which are used on speedways to do away with differential. It is true therefore that the outside wheel has to travel slightly farther in making a turn, in other words it will slip slightly. On a speedway this can be disregarded because the turns are very gradual.

**BATTERY CHARGING OUTFIT**

Q—Can a storage battery charging outfit only be made from 110 volt direct current or else from alternating current?

2—Publish diagram showing how many light sockets and what kind of ammeter is needed.

3—Can either 6 or 12 volt battery be charged with the same outfit?—A Subscriber, Cleveland, Wisconsin.

A—Direct current is the only kind that can be used with a lamp bank or rheostat. For alternating current either a rectifier is required or a motor generator set.

2—The sketch in Fig. 6 shows circuit in which three batteries and the ammeter and lamp bank for resistance are shown connected to 110 volt terminals. This method is not very good except for emergencies or very occasional use on account of the electric energy which is wasted, as most of the electrical current paid for is used up in the lamp.

If only one or two batteries, that is 6 or 12 volts of batteries are to be put on charge, you can figure about  $\frac{1}{2}$  an ampere to each lamp, assuming that 16 candle-power carbon lamps are used. With the 8 lamps shown in the sketch we would then have 4 amperes. Most any ammeter will do, for example, the type used on a Ford car, if no other is available.

In connecting batteries to each other care should be used to see that they are connected from plus to minus as shown. Also that in connecting to the 110 volt terminals that connection is made plus to plus and from minus to minus.

3—Either 6 or 12 volt battery can be charged as indicated.

**LOW GRADE PORCELAIN?**

Q—What causes a spark to jump from the porcelain to the jam nut when it is cold? The porcelain was examined and found in good condition. The plugs were removed and placed near the fire and warmed and put back into the engine and the engine started without difficulty.—Claude Press, Blue Ridge, Texas.

This phenomenon can be traced to a low grade of spark plug insulator. Low grade porcelain shows a drop in its dielectric or insulating strength with a drop in temperature. This condition would not exist if the porcelain were high grade. These low grades of porcelain contain moisture. The application of heat will reduce the moisture content and simultaneously increase insulating or dielectric strength of the porcelain. In the case of a thoroughly dry substance, however, increase in temperature has a reverse effect.

**NECESSARY TO FIT NEW BEARINGS**

Q—Could an exhaust valve lose its temper so it will not hold its seating long?

2—When a new bearing or piston is bought at a Ford service station do they have to be fitted or are they already fitted?

3—Explain driving control of a Pierce-Arrow.—Forest Cripe, Toledo, Ohio.

1—It is possible for an exhaust valve to lose its temper, however, most exhaust valves lose their seat through pitting or warping or burning rather than loss of temper.

2—The bearings must be fitted to the shaft on which they are to be used. They do not come already fitted.

3—We do not quite understand what you mean by driving control. We are of the opinion that you mean, though, the different shifts of the gear set lever. Reverse speed on this car is secured by pushing down on the ball top of gear shifting lever and pulling the lever to the inside and to the rear as far as possible. In order to get in reverse it is necessary to depress this ball or top of the gear shift lever.

First speed is the position just forward of the reverse speed on the inside, second speed is the position farthest forward on the inside of the "H" plate. Third speed is the outside rear position of the lever. Fourth speed is the outside forward position. Any further information you wish on this car we would suggest that you secure it from the instruction book of the year corresponding to the car on which you wish to secure the information.

**GENERATOR TROUBLE WITH 1920 OVERLAND**

Q—We are having trouble with a generator on 1920 model Overland Four which operates in warm weather but does not charge in cold weather except after running for quite a while, the trouble apparently being due to excessive amount of oil working into the generator. We enlarged the oil drain hole  $\frac{5}{32}$  in. but this did not seem to correct the trouble.—C. G. Jones, Mt. Sterling, Ill.

A—When excessive oil gets into a generator it works onto the commutator and from there onto the brushes which absorb a certain amount of the oil so that the surface of the brushes which is in contact with the commutator becomes covered with a glaze which has insulating characteristics. Such brushes will appear to be all right and yet will continue to give the trouble you describe. Would therefore recommend that you try a set of new brushes as we feel this will overcome the trouble.

**REMOVING VIBRATION DAMPER ON 48 HAYNES**

Q—Advise proper way to remove vibration damper on model 47 Haynes. Is it possible to disturb the adjustment of this damper?—A Reader.

The vibration damper on this engine is secured to the shaft by means of a key. There also are four screws which hold the damper to a flange. They are locked by a wire through the heads of each. If the screws are removed the flange and holes should be marked so that it will be put on in the same manner. The main part, however, is held on by a key. The heads of these screws should point toward the radiator.

**CHANGING ENGINES IN WILLYS-KNIGHT**

Q—We have a Willys Knight 38-4 chassis in which we would like to install a  $3\frac{1}{2} \times 5\frac{1}{4}$  Continental engine. Are these engines inter-changeable?—McCullough & Beach Co., Cambridge, Ohio.

A—There is no data available to show whether it is possible to put the Continental engine in the chassis you have. The engines are not interchangeable so in any event it would mean considerable work in making the change. It is one of those jobs which must be worked out individually. There are always some special brackets or castings to be made and these can only be determined when you have on hand the chassis and engine, so necessary measurements can be made.

**TWO WELL KNOWN MECHANICS**

A letter signed "Two Well Known Mechanics," dated Milwaukee, asks Motor AGE to settle a dispute as to whether there is such a thing as a rotary valve engine. That is a queer question for "Two Well Known Mechanics" to ask. How a mechanic who is in the business can escape knowing something of rotary valves is a mystery. We do not blame them for asking the question anonymously. It is rather asking too much for a paper like Motor AGE to print a diagram of a rotary valve engine merely to prove there is such a thing. Numerous diagrams of rotary valve engines have been published in this magazine.

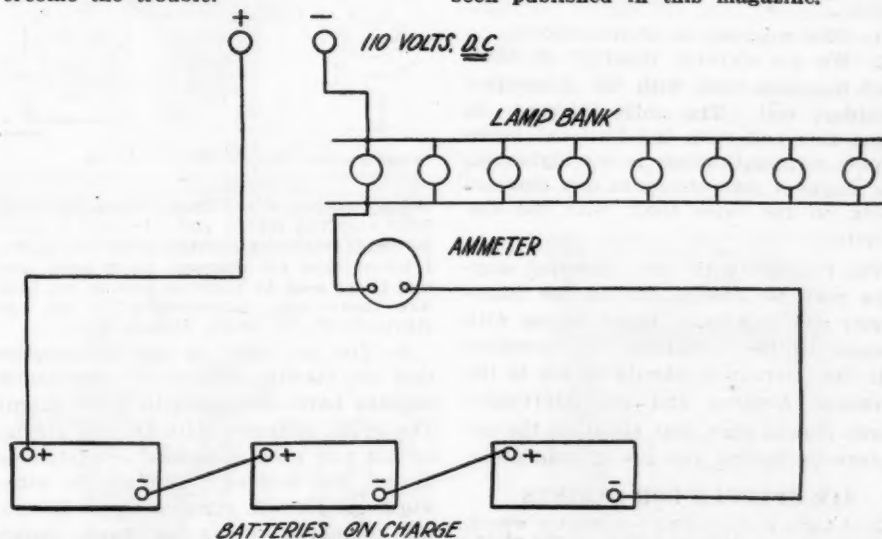
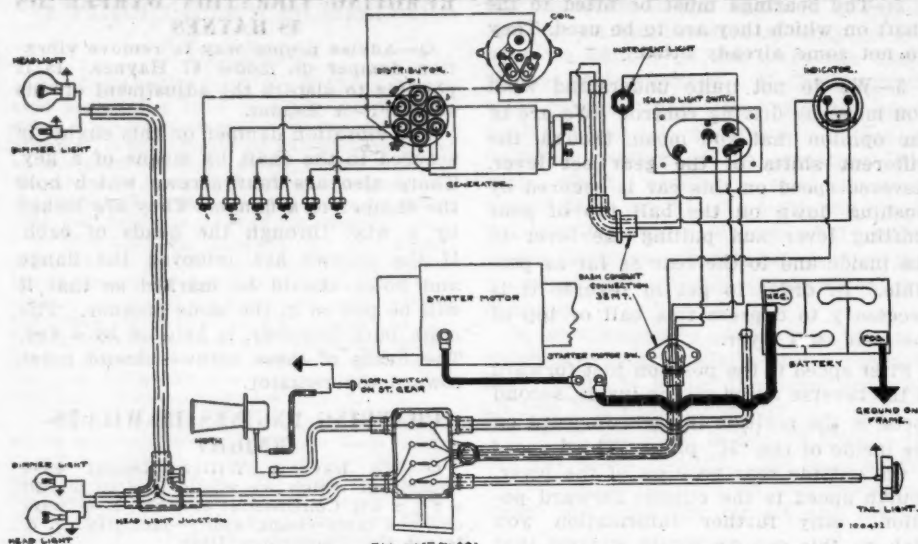
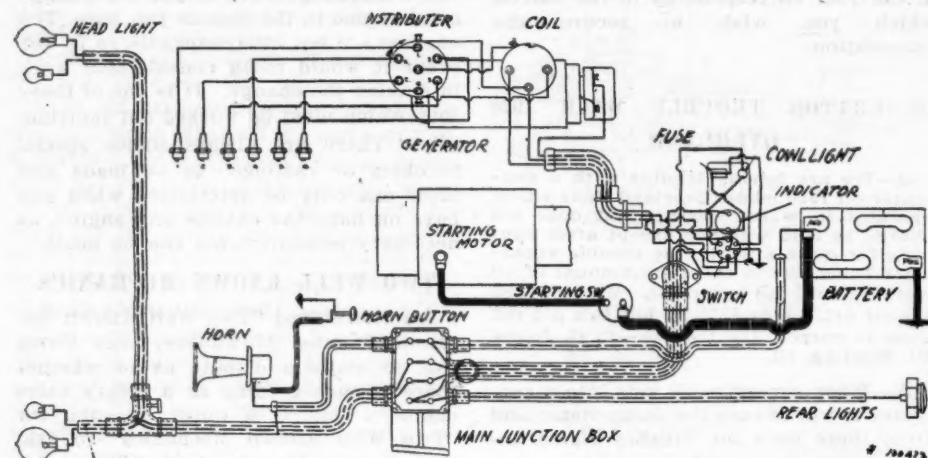


Fig. 6—Charging batteries with 110 volts D. C.





VELIE WIRING MODEL 38 1918



VELIE WIRING MODEL 28 1917

### WIRING DIAGRAM OF 1917-18 VELIE

Q—Publish wiring diagram for 1917, also 1918 Velie.

2—Publish wiring diagram for a 5 terminal Splitdorf coil used with National magneto on 1914 Apperson. The coil has five terminals.—D. E. Foster, Des Moines, Iowa.

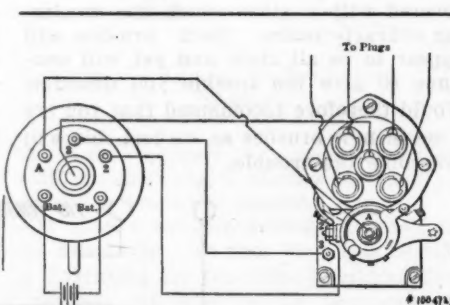
1—This diagram is shown above.

2—We are showing diagram of Splitdorf magneto used with the 5-terminal Splitdorf coil. The only difference in using this coil with the National interrupter terminal which is up higher on the magneto than shown in this diagram being on the same shaft with the distributor.

The trouble with the National magneto may be due to having the interrupter and distributor timed wrong with respect to the armature. In checking this the interrupter should be set in the advanced position and the interrupter points should open just about as the armature is leaving the tip of pole piece.

### AIR STARTER FOR ENGINES

Q—I have designed an air starter which I think may be better suited to the needs of automobile engines than the electric starting motor. The device I have in mind has only one rotary valve which acts as both intake and exhaust valve. Also,



WIRING OF MODEL A SPLITDORF MAGNETO &amp; COIL

the air motor is not larger than the ordinary starting motor and I believe it could be made interchangeable with the latter. I know that air starters have been used and there may be nothing new in my idea. Are there any advantages to an air starter?—F. W. Beall, Dillon, S. C.

A—You are right in your assumption that air starting devices for automobile engines have been used to some extent. The great difficulty with the air starter is that you need considerable equipment to get the desired results. In other words an electric starting motor is simple compared to an air tank, pump, valves, etc., which are necessary with an air starting device.

The modern starting and lighting sys-

tem has been pretty well worked out for automobiles and it would take considerable effort to induce car manufacturers to change to some other system, especially one that has been rejected in the past.

### SPEED OF DODGE BROTHERS CAR

Q—Is the Dodge touring car a strongly built car?

2—What is its maximum speed?

3—Which is the faster a Reo touring car or a Dodge touring car?

4—What is the maximum speed of a Chandler seven passenger touring car?

5—Why are pumps usually used on racing cars?

6—What is the best engine to use for a Ford racer for a 1/2 mile dirt track?

7—How can anyone get into the races?—John Barna, Jr., South Bend, Ind.

1—Yes.

2—50 to 55 m. p. h.

3—You do not state the model of the Reo. However, both these cars have approximately an equal speed.

4—Approximately 60 m. p. h.

5—Oil hand pumps are used on racing cars to supply an extra quantity of oil for lubrication of the engine at extremely high speeds. Sometimes a pump is also used for the fuel feed system to keep the pressure on the gasoline. These hand oil pumps are merely auxiliaries to the regular lubrication system and are used to add the extra oil needed for sustaining high speeds.

6—We know of no best engine to use in the Ford for one-half mile dirt track, however, most of the successful Ford half-mile dirt track racing cars are equipped with overhead valves and have a gear ratio of approximately 4 to 1. Where the rear axle gear ratio is not changed the rear wheels generally are cut down to about 28 in. This is necessary in order to secure a good get-away on the short straight-away.

7—To enter into half-mile race it is necessary to communicate with the management of the place or association under whose jurisdiction the race is being given. Another method is to join some dirt track racing team.

### FORD SERIAL NUMBERS

Q—Give me serial numbers of Ford automobiles by year. Also location of serial number on engine.—G. E. Gayler, Cambridge, Mass.

The following numbers are from Aug. 1 to July 31, 1915-1916, 855501 to 1362200; year 1916-17, 1362201 to 2113500; 1917-18, 2113501 to 2756251; year 1918-19, 2756252 to 3277851; year 1919-20, 3277852 to 4233350; year 1920-21, 4233351 to 5223135; year 1921-22, 5223135 and up. The location of the number will be found on the left side of the cylinder block immediately above the water inlet.

### 1914 CADILLAC ENGINE IN BOAT

Q—We are placing a 1914 Cadillac engine in a boat and would like to have a horse power curve of this engine.—Geo. J. Achweizer, Greenville, Wis.

A power curve of this engine is not available, but we know that the brake test of this engine will show up around fifty horsepower.

# SERVICE EQUIPMENT

## *Aids for Time Saving & Accuracy*

### WALLACE BAND SAW

The Wallace Band Saw, as it is pictured on this page, comes as something of an improvement and is intended for use in the service station where this type of tool is needed.

All adjustments are controlled by hand wheels or thumb screws, without the use of special tools or wrenches.

The height of this band saw is five feet nine inches over all; the table is 42 inches from the floor; floor space required is only 15 by 29 inches. The motor, a  $\frac{1}{2}$  horse-power General Electric, is ball bearing, and runs at 1750 revolutions per minute; the saw runs at 3150 feet per minute.

The blades used are made for this machine. They are of special steel treated and cut so as to serve the greatest number of producing hours on this size wheel. J. D. Wallace & Co., Chicago, Ill.

### HOERNER REAMER GUIDE

Hoerner Reamer Guide, which fits inside the valve and supplies a true center hole through which the reamer may work, is made for all sizes valves, the price being, for Ford and Chevrolet, \$1.25 postpaid in U. S. and for all others \$2. Made by the Hoerner Mfg. Co., 3929 Moneta Ave., Los Angeles.

### HERCULES VALVE LIFTER

The Hercules Valve Lifter is intended to lift the valves in any motor. The plunger, illustrated, locks in place and permits the use of both hands. It is made of malleable iron and reinforced at points of tension. List price, \$5.00. Hercules Products Co., St. Joseph, Mich.

### WEAVER CAR HOIST

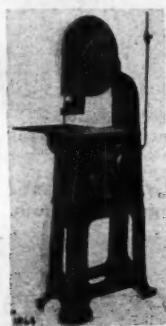
The Weaver Car Hoist is another addition to the Weaver line of service equipment devices and is intended for use in the service station, especially where space is valuable, because of its size. The cut illustrates how the hoist is made. Weaver Shop and Garage Equipment Co., Springfield, Ill.



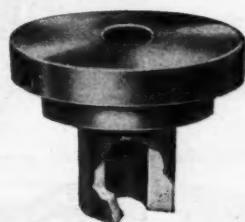
Weaver car hoist



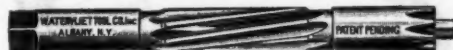
St. Louis gasoline pump



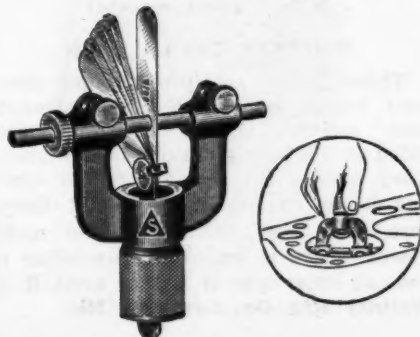
Wallace band saw



Hoerner reamer guide



Watervliet spiral expansion aligning reamer



Stevens cylinder micro-gage

### COLUMBIA ELECTRIC GRINDER AND BUFFER

The electric grinder and buffer shown here is built for light work in the machine shop, garage, service station, and is also used on the farm. The motor is  $\frac{1}{3}$  h.p., single phase A. C., 60 cycle, 110 or 220 volt being interchangeable. Speed 1800 r.p.m. It is equipped with S. K. F. ball bearing and entirely enclosed in dust-proof case. Switch and fuses are furnished with the machine. Emery wheels not furnished. Prices, \$96.25 for No. E-60 and \$87.50 for No. E-61. Columbia Mfg. Co., Belleville, Ill.

### ST. LOUIS GASOLINE PUMP

The St. Louis Pump & Equipment Co. has brought out, within the last few months, a number of pumps with various improvements. Motor driven gasoline pumps with improvements, such as pictured here, are among the latest designs offered by this company, whose headquarters are at St. Louis, Mo.

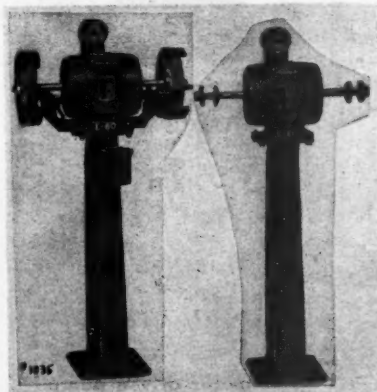
### WATERVLIET SPIRAL EXPANSION ALIGNING REAMER

The Watervliet Tool Co., Albany, N. Y., has on the market a number of reamers for use on all kinds of cars and trucks. Perhaps the cut will better explain this tool. It is made of properly machined tool steel and combines boring and reaming. It is adapted to piston pin work. It has a self-cutting pilot which does rough cutting. Prices range from \$15 to \$21.

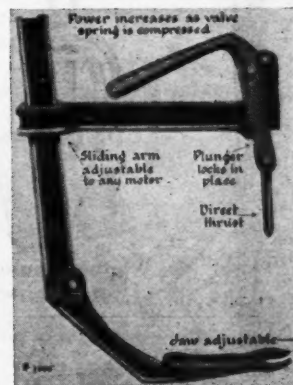
### STEVENS CYLINDER MICRO-GAGE

This gage consists of one fixed pin and one adjustable pin, mounted in a holder. The combined length of both pins, when together, equals the exact standard size of the cylinder to be measured (in case of Ford,  $3\frac{3}{4}$  in.).

May also be used as a standard over-size gage by inserting the required blade of a thickness gage between the pins. Price, complete, \$2.50. Stevens & Co., 375 Broadway, New York.



Columbia electric grinder and buffer



Hercules valve lifter



# The ACCESSORY SHOW CASE

## New Sources of Retail Profit

### DETROIT MOTOR DRIVEN PUMP

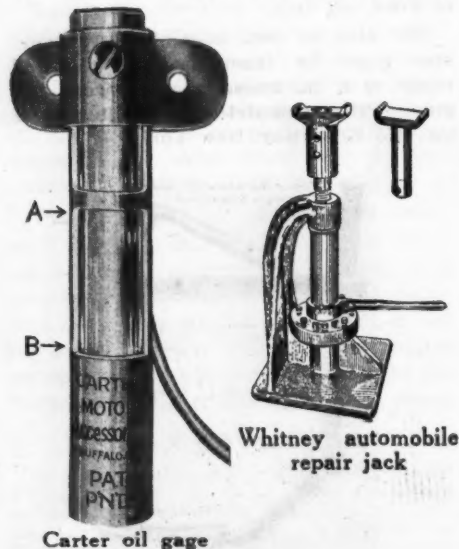
A new motor driven tire pump suitable for transmission or other type of installation in which it is claimed that the air chamber requires no oil, has been brought out by the Detroit Carrier & Mfg. Co., Detroit, Mich. The pump is a diaphragm type in which the diaphragm is driven off the pump shaft by a crank and connecting rod arrangement. The pumping is effected by the reciprocation or pulsation of the diaphragm and, consequently, requires no lubrication. The pump is so manufactured that replacement of the diaphragm is a simple matter should it become necessary and consists of but very few moving parts.

### CARTER OIL GAGE

The Carter oil gage is attached to instrument board and connecting tube is attached to lower petcock with an elbow. The liquid in glass tube in gage indicates the relative amount of oil in the crankcase. When liquid in gage is at "A," the oil in crankcase is at upper petcock level. When liquid in gage is at "B," the oil is at the lower petcock level. No plungers, floats or other moving parts are used. Can be attached to all Ford models and Chevrolet model 490. Price \$3. Carter Motor Accessories, Inc., 386 Pearl St., Buffalo.

### WILCOX ELECTRIC GASOLINE GAGE

The Wilcox electric gasoline gage fits any tank and is quite simple in installation. It consists of a heavily insulated cable with a dial at both ends, one dial is before the driver on the dash, the other replaces the cork float rear tank gage. Operates from the ignition switch through a commutator brush attached to the cork float which is in unit with the gasoline tank dial. Wilcox Pressed Steel Co., 1713 Armitage Ave., Chicago.



Carter oil gage

Whitney automobile repair jack



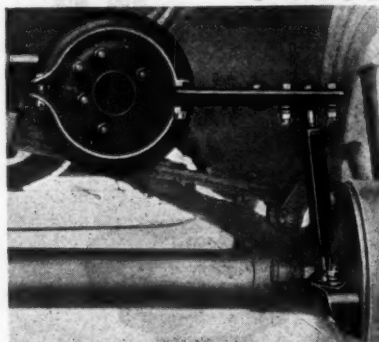
Haines improved lighting switch



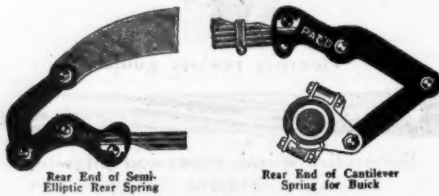
Gray automatic ignition cutout



Wilcox electric gasoline gage



Blackmore shock and roll preventer



S. &amp; S. shock absorber

### WHITNEY REPAIR JACK

These jacks are proportioned, every part being webbed to assist strength and safety. Ample area is provided at the base to insure firm support. They require but very little floor space and do not combine much weight, therefore, they may be operated in many places where it would be impossible to use any other type of jack or hoist. R. S. Whitney Mfg. Co., Lewiston, Me.

### BLACKMORE SHOCK AND ROLL PREVENTER

The Blackmore shock and roll preventer is built on a principle which utilizes the friction of the parts inside the device to regulate the compression of the springs when the car is in motion and to check the violent rebound of the springs after the wheels have passed over a bump. These shock absorbers can be attached to the standard bolts on the Ford frame and axle without changes. Price \$28 per set of four. Charles C. Blackmore Co., Dayton, O.

### GRAY SAFETY FIRST AUTOMATIC IGNITION CUTOFF

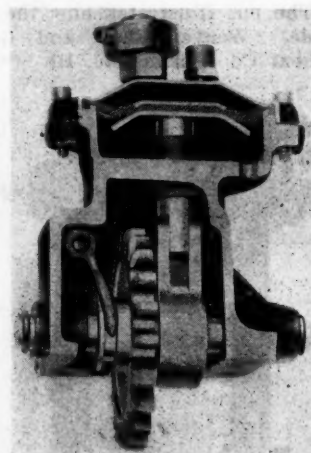
Prevents Fordson tractors from turning over backwards. Can be installed on tractor for \$15, and prevents tractor rearing backward by immediately stopping the engine by cutting out the spark when front end leaves the ground 22 inches. It can be adjusted to break ignition contact when tractor reaches any angle that would cause an accident. R. H. & H. C. Gray, Seattle, Wash.

### HAINES IMPROVED LIGHTING SWITCH

Benefits derived from the Haines improved lighting switch are that the tail light may be dimmed alone, dimmers may be lighted alone, dimmers and spot light may be operated alone, and so on. Any one light or combination of lights can be individually controlled from one switch.—Muskegon Valve & Mfg. Co., Muskegon, Mich.

### S & S SHOCK ABSORBER

S & S shock absorber allows easy recovery from shock, because the shock is stopped at the spring before reaching the frame, thereby assuring easier riding. Starkweather-Snook Co., Moline, Ill.

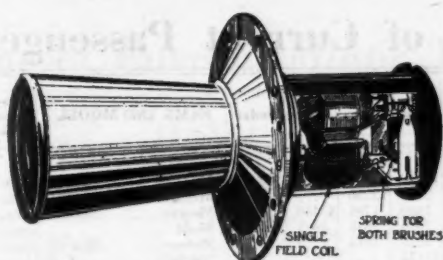


Detroit motor driven pump

## BRIGGS AND STRATTON ELECTRIC HORN

By novel construction of the motor, the Briggs & Stratton Co., Milwaukee, has been able to use a single field coil in its new motor driven horn. The new construction has simplified the manufacture of the horn.

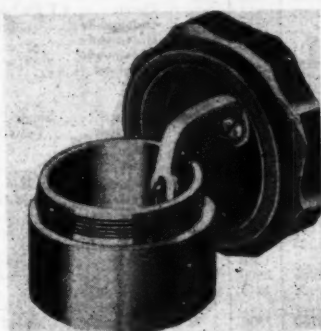
There is virtually no interior wiring of any kind. The fiber bearings make it unnecessary to lubricate the horn in any way. The new brush rigging makes it impossible for the brushes to stick. The brushes are not lubricated, as there is one carbon and one copper brush. By the design of the brush rigging with a single coil spring between the two brushes, which are mounted on a sub-assembly, equal pressure is always exerted on the brushes. The horn can be completely disassembled by removing two nuts. The adjustment of the horn can be made externally with the use of a screwdriver. Price \$5.



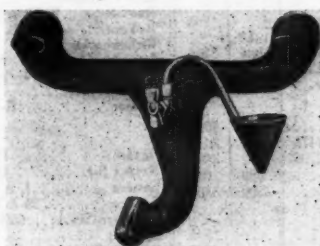
Briggs & Stratton electric horn



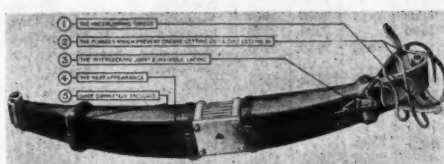
Herlth Visor



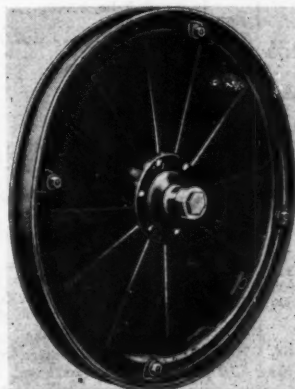
Rust's safety filler caps



Joe primer



Wefco spring cover



Gier-Lewis steel wheel

## WARD JUNIOR VISOR

This visor, though light in weight, cannot be moved by wind or vibration. It is held in place by two side brackets, fastened to clamps by means of wing nuts which make it adjustable from the driver's seat. Two  $\frac{3}{4}$  in. steel rods extend from either end of the side brackets, stretching the covering material which is a good grade motor car topping, and the side brackets stretch it from end to end. All metal parts are finished with a high grade black motor car enamel, baked on to prevent rust. \$2.50. E. T. Ward Mfg. Co., Maywood, Ill.

## A C FORD SPARK PLUG

A new Ford spark plug, known as the "A C 1075 Special for Fords," has been brought out by the A. C. Spark Plug Co., Flint, Mich.

The porcelain of the A C 1075 plug is removable. It is girdled by six knife-edge ridges, which attain sufficient heat to burn off soot or carbon as fast as it forms, thus preventing "shorts." The exposed end of the porcelain is short and stocky to protect it against accident. The side electrode is rugged and shaped to form a natural oil drain.

## BENZER WIND DEFLECTORS

On this page of the February 16th issue of MOTOR AGE the Benzer Wind Deflectors were described. The price given in that item was \$7. The wind Deflectors as illustrated is priced at \$25 and \$7 is the price of the replacement of the glass without the mirror.

## JOE PRIMER

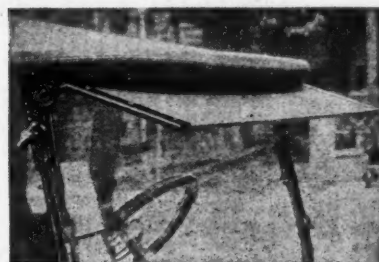
The Joe Primer can be installed on any car having an intake manifold that can be tapped. Various uses are assigned to this accessory, the chief use being easier starting in cold weather after installation. Price, \$2.50. J. C. Guter & Co., Waverly, Ia.

## RUST'S SAFETY FILLER CAPS

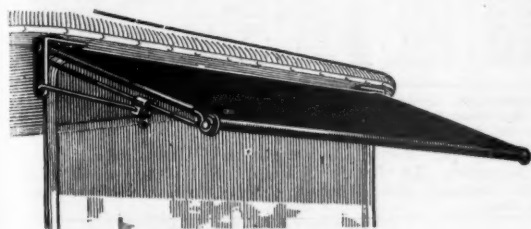
Rust's Safety Filler Caps feature a lock which is adjustable for putting water in radiator or gasoline in tank. Can be used on either the tank or radiator. Price \$3.00. Rust Mfg. Co., Marshalltown, Ia.

## PETRALYKE VISOR

Petralyke visors are constructed in various sizes, adjustable to any windshield. Petralyke board is a composition which is set in a steel frame and is finished in dull black—Petralyke Auto Visor Co., Appleton, Wis.



Petralyke visor



Ward junior visor

The Wefco spring cover is made of leather and is fitted tightly about the spring, after a covering of grease has been applied for lubrication. The cover is hand-sewed with a special needle supplied with the cover. After the application of the lubricant to the spring, it is not necessary to remove the cover to further grease or oil the spring as the leather holds a certain amount of grease retaining power. The Wefco spring cover protects against rust and dust particles which work their way into the spring and take from its properties.—Wefco Co., 154 Nassau St., New York City.



## Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ambassador.....R	Cont.	6-3 1/2 x 5 1/2	136	33x5	14500	14500	14500	14500	14500
American.....C	H-S.	6-3 1/2 x 5 1/2	127	32x4	2195	2195	2195	2195	2195
Anderson.....Series 40	Cont.	6-3 1/2 x 4 1/2	120	33x4	2195	1650	1795	2450	2550
Apperson.....8-21-S	Ow.	8-3 1/2 x 4 1/2	130	34x4 1/2	2020	2020	2020	2020	2020
Auburn Beauty Six.....6-51	Cont.	6-3 1/2 x 4 1/2	121	32x4	1575	1575	1615	2275	2395
Auburn Beauty Six.....6-51	Cont.	6-3 1/2 x 4 1/2	121	32x4 1/2	12195				
Beggs.....20T	Cont.	6-3 1/2 x 4 1/2	120	33x4	1775	1520		2330	2420
Bell.....4-32	H-S.	4-3 1/2 x 5	114	31x4	1195	1195			
Bell.....6-50	H-S.	6-3 1/2 x 5	124	32x4	1545	1545			
Biddle.....B1 & B5	Buda.	4-4 x 5 1/2	121	32x4	2950	12950		3950	3950
Brewster.....91	Ow.	4-4 x 5 1/2	125	32x4 1/2	16000	6000		9200	9200
Buick.....1922-34-35-36-37	Ow.	4-3 1/2 x 4 1/2	109	31x4	895	895		1205	1305
Buick.....1922-41-5-6-7	Ow.	6-3 1/2 x 4 1/2	118	33x4 1/2	1365	1395		1835	2165
Buick.....1922-49-50	Ow.	6-3 1/2 x 4 1/2	124	34x4 1/2	1785		1585	2075	2375
Cadillac.....61	Ow.	8-3 1/2 x 5 1/2	132	33x5	3100	3150	3150	3925	4100
Case.....X	Cont.	6-3 1/2 x 4 1/2	122	32x4 1/2		1890		2790	2790
Case.....V	Cont.	6-3 1/2 x 5 1/2	126	34x4 1/2		1935	2585	2990	2990
Chalmers.....1922	Ow.	6-3 1/2 x 4 1/2	117	32x4	1245	1295	1395	1995	2295
Chalmers.....1922	Ow.	6-3 1/2 x 4 1/2	122	32x4			1395		
Champion.....Tourist	Lyc.	4-3 1/2 x 5	113	32x3 1/2		995	1995		
Champion.....Special	H-S.	4-3 1/2 x 5	118	32x4	1095	1095			
Chandler.....Sia	Ow.	6-3 1/2 x 5	123	33x4	1595	1595	1695	2295	2395
Chevrolet.....490	Ow.	4-3 1/2 x 4 1/2	102	30x3 1/2	525	525		875	875
Chevrolet.....FB	Ow.	4-3 1/2 x 4 1/2	110	32x4	975	975		1575	1575
Cleveland.....41	Ow.	6-3 x 4 1/2	112	32x4	1175	1195		1550	1595
Climber Four.....K	H-S.	4-3 1/2 x 5	115	33x4	1385	1385			
Climber Six.....S	H-S.	6-3 1/2 x 5	126 1/2	32x4 1/2	2250	2250		3000	3100
Cole.....890	North.	8-3 1/2 x 4 1/2	127 1/2	33x5	2485	2485	3185	3685	
Columbia Challenger.....Itut.	Ow.	6-3 1/2 x 5	115	32x4		1195		1995	1995
Columbia.....D-C&CS	Cont.	6-3 1/2 x 4 1/2	115	32x4	1475	1475	1475	2350	
Comet.....C-53	Cont.	6-3 1/2 x 5 1/2	125	33x4 1/2		1985	2085	2985	
Crawford.....22-60	Cont.	6-3 1/2 x 5 1/2	122 1/2	32x4	3000	3000		4500	
Daniels.....D-19	Ow.	8-3 1/2 x 5 1/2	132	34x4 1/2	15350	15350	5350	6250	6950
Davis.....71	Cont.	6-3 1/2 x 4 1/2	114	31x4		1195			
Davis.....61-67	Cont.	6-3 1/2 x 4 1/2	120	33x4	1595	1595	1695	2095	2195
Dixie Flyer.....H-S-70	H-S.	6-3 1/2 x 4 1/2	112	32x4	1095	1095	1295	1545	1595
Dodge Brothers.....Ow.	Ow.	4-3 1/2 x 4 1/2	114	32x4	850	880		1280	1440
Dorris.....6-80	Ow.	6-4 x 5	132	33x5		1475	4785	5800	7190
Dort.....19-11	D-Ly.	4-3 1/2 x 5	108	31x4	865	865		1315	1445
Driggs.....Ow.	Ow.	4-3 1/2 x 4 1/2	104	30x3 1/2	1275	1275		1975	
Duesenberg.....Straight 8	Ow.	8-2 1/2 x 5	134	33x5	6500	6500	6790	7800	7800
Du Pont.....A	Ow.	4-3 1/2 x 5 1/2	124	32x4 1/2	3000	3200		3900	4000
Durant.....A-22	Ow.	6-3 1/2 x 4 1/2	109	31x4		890		1365	1365
Durant.....B-22	Anst.	6-3 1/2 x 4 1/2	123	32x4 1/2	1600	1650		2250	2400
Earl.....40	Ow.	4-3 1/2 x 5 1/2	112	32x4	1485	1185			1895
Ekar.....K-4	Lyc.	4-3 1/2 x 5	118	33x4	1095	1095	11095	1345	
Ekar.....7-R	Ow.	6-3 1/2 x 4 1/2	118	33x4	1395	1395	1395	2095	2165
Elgin.....K-1	Falls.	6-3 1/2 x 4 1/2	118	33x4	1345	1295	1345	2195	2195
Essex.....Ow.	Ow.	4-3 1/2 x 5	108 1/2	32x4	1095	1095		1345	1895
Falcon, H.P.M.....12-D22	Ow.	4-2 1/2 x 4	100	27x3 1/2	2800	13000			4000
Ferris.....Series 60	Ow.	6-3 1/2 x 5 1/2	130	32x4 1/2	2575		2475		3475
Ferris.....Series 70	Ow.	6-3 1/2 x 5 1/2	130	32x4 1/2	2895		2795		3395
Ford.....T	Ow.	4-3 1/2 x 4	109	30x3 1/2	1319	1348		580	615
Franklin.....9-B	Ow.	6-3 1/2 x 4	115	32x4	2400	2450		3200	3450
Gardner.....T-R & G	Lyc.	4-3 1/2 x 5	112	32x3 1/2	895	895			1595
Grant.....Ow.	Ow.	4-3 1/2 x 5 1/2	124	32x4 1/2	3985	3785			
Grant.....Ow.	Ow.	6-3 1/2 x 4 1/2	116	32x4	1395	1395		1895	1945
H.C.S.....Weid.	Ow.	4-3 1/2 x 5 1/2	120	32x4 1/2	2725	12775		3450	3650
Halladay.....4	Ow.	4-3 1/2 x 5	115	32x4	1095	1095		1990	2085
Halladay.....6	Ow.	6-3 1/2 x 5	115	32x4	1595	1595		2295	2395
Handley-Knight.....Kn't	Ow.	4-4 1/2 x 4 1/2	125	32x4 1/2			2650	3450	3450
Hanson.....30	Cont.	6-3 1/2 x 4 1/2	112	31x4		995			
Hanson Six.....60	Cont.	6-3 1/2 x 4 1/2	121	32x4	1595	1595	1795	12475	2585
Hatfield.....A-42	H-S.	6-3 1/2 x 5	115	32x4	1215	1345		1950	1950
Haynes.....75	Ow.	6-3 1/2 x 5 1/2	132	34x4 1/2	2595	2295		3395	3395
Haynes.....55	Ow.	6-3 1/2 x 5	121	33x4	1645	1595		2295	2595
Haynes.....Series 4	Ow.	12-2 1/2 x 5	132	34x4 1/2	2895	3595	2895	3995	
Holmes.....Ow.	Ow.	6-3 1/2 x 4 1/2	126	34x4 1/2	12950		2050	3850	4150
Hudson Super 6.....Ow.	Ow.	6-3 1/2 x 5	128	34x4 1/2	1695	1795	1745	2570	2650
Huffman.....R	Cont.	6-3 1/2 x 4 1/2	120	32x4	1845	1795		2795	
Hupmobile.....Series R	Ow.	4-3 1/2 x 5 1/2	112	32x4	1250	1250		1835	1935
Jackson.....638	H-S.	6-3 1/2 x 5	121	32x4 1/2	1685	1485		2985	2985
Jordan.....MX	Ow.	6-3 1/2 x 4 1/2	120	32x4	2095	2095		3200	3200
Jordan.....F	Cont.	6-3 1/2 x 5 1/2	127	32x4 1/2			2475		3500
Kenworthy.....6-90	Ow.	8-3 x 5 1/2	130	32x4 1/2	5000	5000	5250	6000	6000
Kessler.....K	Ow.	4-3 1/2 x 3 1/2	120	32x4		1995		2445	
King.....K-1922	Ow.	8-3 x 5	124	32x4 1/2	2140	2125	2125	3125	3235
Kissel.....45	Ow.	6-3 1/2 x 4 1/2	121	32x4 1/2	2675	2675	2175	3275	3475
Kline Kar.....6-55-K	Cont.	6-3 1/2 x 4 1/2	117	35x4	1790	1790	1790	2850	2890
LaFayette.....Ow.	Ow.	8-3 1/2 x 5 1/2	132	33x5	3985	4090	4090	5000	5175
Leach.....999	Ow.	6-3 1/2 x 5 1/2	134	32x4 1/2	6500	6500	6500	6500	6500
Lexington.....Anst.	Anst.	6-3 1/2 x 4 1/2	122	32x4		1985			
Lexington.....Anst.	Anst.	6-3 1/2 x 4 1/2	123	32x4 1/2			2285		3350
Liberty.....10-D	Ow.	6-3 1/2 x 5	117	33x4 1/2	1295	1295	11345	2085	2245
Lincoln.....Ow.	Ow.	8-3 1/2 x 5	136	33x5	13800	3300	3300	3900	4200
Locomobile.....48	Ow.	6-4 1/2 x 5 1/2	142	35x5		17600	7600	10500	11000
Malibon.....B	Ow.	6-3 1/2 x 4 1/2	116	32x4	1395	1395	11495	2165	2165
Marmen.....34	Ow.	6-3 1/2 x 5 1/2	136	32x4 1/2	13700	3900	3700	4700	5150
Maxwell.....Ow.	Ow.	4-3 1/2 x 4 1/2	109	31x4	\$ 885	\$ 885		\$1385	\$1485
McFarlan.....1921	Ow.	6-4 1/2 x 5	140	33x5	6300	6300		7500	7500
Merced.....Series 5	Ow.	4-3 1/2 x 4 1/2	132	32x4 1/2	3950	3950		4850	5250
Merit.....Cont.	Cont.	6-3 1/2 x 4 1/2	119	32x4	1985	1985			
Meteor.....R & RR	Duet.	4-4 1/2 x 5	129	32x4 1/2	5500	5500			
Mitchell.....F-50	Ow.	6-3 1/2 x 5	120	33x4	11490	1490	1790	2290	2440
Mitchell.....F-50	Ow.	6-3 1/2 x 5	127	33x4			1795		
Monroe.....1922-S-13	Ow.	4-3 1/2 x 4 1/2	115	32x3 1/2	1295	1295			
Monroe.....1922-S-14	Ow.	4-3 1/2 x 4 1/2	115	33x4				2075	2175
Moore.....6-40	Cont.	3 1/2 x 4 1/2	115	31x4		1295			
Moore.....6-48	Cont.	6-3 1/2 x 4 1/2	122	32x4	1785	1785	2285	2785	2785
Moore.....6-68	Cont.	6-3 1/2 x 4 1/2	125	32x4 1/2			2285		
Murray-Mac Six.....Ow.	Ow.	6-3 1/2 x 5 1/2	128	34x4 1/2	4250	4250		4250	
Nash.....601-96-97	Ow.	6-3 1/2 x 5	121	33x4	1360	1390	1540	2090	2390
Nash.....602-94-95	Ow.	6-3 1/2 x 5	127	34x4 1/2			1540	2090	2390
Nash Four.....41-4	Ow.	4-3 1/2 x 5	112	33x4	965	965		1485	1645
National.....BB	Ow.	6-3 1/2 x 5 1/2	130	32x4 1/2	2750	2750	2750	3890	3990
Nema.....3C	Bea.	6-3 1/2 x 4 1/2	128	32x4 1/2	2000	2100	*2200		3200
Nema.....1D	Cont.	6-3 1/2 x 5 1/2	128	32x4 1/2	3000	3100	*3200		5500
Nervalk.....430-KS	Lyc.	4-3 1/2 x 5	116	32x3 1/2		1035			
Oakland.....6-44	Ow.	6-2 1/2 x 4 1/2	115	32x4	1120	1145	1265	1685	1785
Ogden.....6 T De Luxe	Cont.	6-3 1/2 x 4 1/2	134	33x5	4250	4250	4350	5200	5500
Oldsmobile.....43-A	Ow.	4-3 1/2 x 5 1/2	115	32x4	1145	1145		1645	1795
Oldsmobile.....46	Ow.	8-2 1/2 x 4 1/2	122	33x4 1/2		1735	1735	2635	
Oldsmobile.....47	Ow.	8-2 1/2 x 4 1/2	115	32x4	1995	1995		2145	2295
Overland.....4	Ow.	4-3 1/2 x 4	100	30x3 1/2	550	550		850	895
Packard.....Single Six	Ow.	6-3 1/2 x 4 1/2	116	33x4 1/2	2350	2350		3125	3350
Packard.....Twin Six	Ow.	12-3 x 5	136	35x5	3850	3850	3850	5240	5400
Paige.....6-44	Ow.	6-3 1/2 x 5	119	32x4	1465	1465		1995	2245
Paige.....6-66	Cont.	6-3 1/2 x 5	131	33x4 1/2	1245	12495	2195	3195	3155
Paterson.....22-6-52	Cont.	6-3 1/2 x 4 1/2	120	32x4 1/2		1550	1585	2595	2595
Peerless.....56-S-7	Ow.	8-3 1/2 x 5	125	34x4 1/2		2790	2790	3500	3790
Piedmont.....4-30	Lyc.	4-3 1/2 x 5	116	32x3 1/2		970			
Piedmont.....6-40	Cont.	6-3 1/2 x 4 1/2	122	32x4		1285			
Pierce-Arrow.....Ow.	Ow.	6-4 x 5 1/2	138	33x5	7000	6500	6500	8000	8500
Pilot.....6-45	Teeter	6-3 1/2 x 5	120	32x4	1500				
Pilot.....6-									

## Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Acason	1 1/2	\$1650	3 1/2 x 5	34x5 1/2	34x5 1/2	W	Commerco, 18	2 1/2	\$2495	4 1/2 x 5 1/2	36x6 1/2	36x7 1/2	W	Garford, 25	1 1/2	\$1990	3 1/2 x 5 1/2	36x3 1/2	36x4	W
Acason, RB	1 1/2	1950	3 1/2 x 5 1/2	36x3 1/2	36x6	W	Concord, A	2	3150	4 1/2 x 5 1/2	36x3 1/2	36x6	W	Garford, 70-H	2	2750	4 1/2 x 5 1/2	36x4	36x7	W
Acason, H	2 1/2	2750	4 1/2 x 5 1/2	36x4	36x8	W	Concord, B	3	3600	4 1/2 x 5 1/2	36x4	36x8	W	Garford, 77D	3 1/2	3750	4 1/2 x 5 1/2	36x5	36x6d	W
Acason, L	3 1/2	3450	4 1/2 x 5 1/2	36x5	36x10	W	Concord, AX	2	3250	4 1/2 x 5 1/2	36x3 1/2	36x6	W	Garford, 68D	5	4500	5 x 6 1/2	36x6	40x6d	W
Acason, M	5	4350	5 x 6 1/2	36x6	40x12	W	Concord, BX	3	3600	4 1/2 x 5 1/2	36x4	36x8	W	Garford, 150-A	7 1/2	5200	5x6 1/2	36x6	40x7d	W
Ace, C	1 1/2	2295	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Cook, 51	2 1/2	3600	4 1/2 x 5 1/2	36x6 1/2	40x8 1/2	W	Gary, F	1 1/2-1 1/4	2600	3 1/2 x 5	36x3 1/2	36x4	W
Ace, A	2 1/2	2795	4 1/2 x 5 1/2	36x4	36x7	W	Corbitt, E-22	1	1480	3 1/2 x 5	34x3 1/2	34x4	W	Gary, I	2	2900	4 x 5 1/2	36x3 1/2	36x5	W
Acme, G	3/4	.....	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Corbitt, D-22	1 1/2	2200	3 1/2 x 5	34x3 1/2	34x4	W	Gary, J	2 1/2	3800	4 1/2 x 5 1/2	36x4	36x7	W
Acme, B	1	.....	3 1/2 x 5	34x3 1/2	34x5	W	Corbitt, C-22	2	2600	4 1/2 x 5 1/2	36x3 1/2	36x6	W	Gary, K	3 1/2	4900	4 1/2 x 5	36x5	40x5d	W
Acme, F	1 1/2	.....	3 1/2 x 5	34x3 1/2	34x5	W	Corbitt, B-22	2 1/2	3000	4 1/2 x 5 1/2	36x4	36x7	W	Geraix, M	5	5900	5 x 6 1/2	36x6	40x6d	W
Acme, A	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x7	W	Corbitt, R-22	3	3200	4 1/2 x 5 1/2	36x4	36x8	W	Geraix, K	1 1/2	3100	4 x 5 1/2	36x3 1/2	36x7	W
Acme, AC	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x7	W	Corbitt, A-22	3 1/2-4	3500	4 1/2 x 5 1/2	36x5	36x10	W	Geraix	2 1/2	3500	4 1/2 x 5 1/2	36x4	36x8	W
Acme, C	3 1/2	.....	4 1/2 x 5 1/2	36x5	40x10	W	Corbitt, AA-22	5	4500	4 1/2 x 5	36x6	40x6d	W	Golden West, GH	3 1/2	4500	4 1/2 x 5	36x5	40x12	W
Acme, E	5	.....	4 1/2 x 5	36x6	40x12	W	Day-Elder, AS	1	1600	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Golden West, G	3 1/2	5000	4 1/2 x 5 1/2	36x6	36x6	W
American, 25	2 1/2	3350	4 x 6	36x4	36x4d	W	Day-Elder, B	1 1/2	2000	3 1/2 x 5	34x3 1/2	34x5	W	Graham Bros.	1-Ton	1265	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
American, 40	4	4275	4 x 6	36x5	36x5d	W	Day-Elder, D	2	2400	4 1/2 x 5 1/2	36x4	36x7	W	Graham Bros.	1 1/2-Ton	1325	3 1/2 x 4 1/2	33x4 1/2	36x6 1/2	F
Apex, G	1	1450 1/2	3 1/2 x 5	33x5 1/2	33x5 1/2	I	Day-Elder, C	2 1/2	2750	4 1/2 x 5 1/2	36x4	36x7	W	Graham-Pion. 10	1	1365	3 1/2 x 5	33x5 1/2	33x5 1/2	F
Apex, D	1 1/2	1915	3 1/2 x 5 1/2	34x3 1/2	34x4	I	Day-Elder, E	3 1/2	3150	4 1/2 x 5 1/2	36x5	36x5d	W	Graham-Pion. 15	1 1/2	1900	3 1/2 x 5	36x3 1/2	36x5	I
Apex, E	2 1/2	2605	4 1/2 x 5 1/2	36x4	36x7	I	Day-Elder, F	5	4250	4 1/2 x 5	36x5	40x6d	W	Graham-Pion. 65	1 1/2	2500	3 1/2 x 5	36x3 1/2	36x5	W
Apex, F	3 1/2	3975	4 1/2 x 5	36x5	36x10	I	Dearborn, E	1	1600	3 1/2 x 5 1/2	35x5	35x5	W	Graham-Pion. 20	2	2925	4 1/2 x 5 1/2	36x4	36x7	W
Armleder, 20	1	.....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Dearborn, FX	1 1/2	2300	3 1/2 x 5 1/2	34x4	34x5	W	Graham-Pion. 30	3	3275	4 1/2 x 5 1/2	36x4	36x4d	W
Armleder, 21	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x6	W	Dearborn, 48	2	2590	3 1/2 x 5 1/2	34x4 1/2	34x7	W	Graham-Pion. 75-P	3 1/2	4225	4 1/2 x 5 1/2	36x6 1/2	42x9 1/2	W
Armleder, 40	1 1/2	.....	4 1/2 x 5 1/2	36x4	36x7	W	Defiance, G	1	1695	3 1/2 x 5	35x5 1/2	35x5 1/2	B	Graham-Pion. 40	4	3995	4 1/2 x 5 1/2	36x5	36x5d	W
Armleder, HW	2 1/2	.....	4 1/2 x 5 1/2	36x5	40x5d	W	Defiance, D	1 1/2	2095	3 1/2 x 5	35x5 1/2	35x6 1/2	I	Graham-Pion. 50	5-6	4895	4 1/2 x 5	36x6	40x6d	W
Armleder, KW	3 1/2	.....	4 1/2 x 5	36x5	36x5d	W	Defiance, E	2	2275	3 1/2 x 5	35x5 1/2	35x7 1/2	I	Hahn, J4	1	.....	3 1/2 x 5	34x5	34x5	W
Atco, B	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	DeMartini, 1 1/2	1 1/2	2600	3 1/2 x 5	34x3 1/2	34x6	W	Hahn, CD	1 1/2	.....	4 1/2 x 5 1/2	36x3 1/2	36x6	W
Atco, B1	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x8	W	DeMartini, 2	2	3300	4 x 5 1/2	36x3	36x7	W	Hahn, EE	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x8	W
Atco, A	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x8	W	DeMartini, 3	3	4250	4 1/2 x 5 1/2	36x4	36x10	W	Hahn, F	3 1/2	.....	4 1/2 x 5	36x5	36x10	W
Atlas, M.D.	1	1185	3 1/2 x 5	32x4 1/2	32x4 1/2	I	DeMartini, 4	4	4800	4 1/2 x 5	36x5	36x12	W	Hahn, EF	5	.....	4 1/2 x 5	36x6	40x12	W
Atterbury, 20R	1 1/2	2475	3 1/2 x 5	34x3 1/2	34x5	W	Denby, 31	1 1/4	1485	3 1/2 x 5	35x5 1/2	35x5 1/2	B	Hal-Fur, E	1 1/2	2350	4 x 5 1/2	34x5 1/2	38x7 1/2	W
Atterbury, 7CX	2 1/2	3175	4 1/2 x 5 1/2	36x4	36x4d	W	Denby, 33	1 1/2	2145	3 1/2 x 5	35x5 1/2	35x7 1/2	I	Hal-Fur, B	2 1/2	3000	4 1/2 x 5 1/2	35x5	38x7 1/2	W
Atterbury, 7D	3 1/2	3975	4 1/2 x 5 1/2	36x5	40x5d	W	Denby, 34	2	2395	3 1/2 x 5	36x3 1/2	36x6	I	Hal-Fur, F	3 1/2	4000	4 1/2 x 5 1/2	36x6 1/2	40x10 1/2	W
Atterbury, 8E	5	4975	4 1/2 x 5	36x5	40x6d	W	Denby, 35	2 1/2-3	2795	4 1/2 x 5 1/2	36x4	36x7	I	Hall, 1 1/2	1 1/2	3100	3 1/2 x 5 1/2	34x5 1/2	38x7 1/2	W
Autocar, 21UF	1 1/2-2	1950	4 1/2 x 5 1/2	34x4	34x5	D	Dependable, A	3 1/2-1	1650	3 1/2 x 5	34x5	36x6	W	Hall, 2 1/2	2 1/2	3275	4 1/2 x 5 1/2	36x4	36x6	W
Autocar, 21UG	1 1/2-2	2050	4 1/2 x 5 1/2	34x4	34x5	D	Dependable, C	1 1/2	2350	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Hall, 3 1/2	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x5d	W
Autocar, 27H	2	2950	4 x 5 1/2	34x5	36x7	D	Dependable, D	2	2650	4 x 5	34x5	36x6	W	Hall, 5	5	5100	4 1/2 x 5 1/2	36x5	40x6d	C
Autocar, 27K2	2	3075	4 x 5 1/2	34x5	36x7	D	Dependable, E	2 1/2	2950	4 1/2 x 5 1/2	36x4	36x7	W	Hall, 7 chain	7	5100	4 1/2 x 5 1/2	36x5	40x6d	C
Autocar, 26V	5	3950	4 1/2 x 5 1/2	34x6	36x12	D	Dependable, F	3 1/2	3550	4 1/2 x 5 1/2	36x6	36x7	W	Harvey, WOA	2	2650	4 1/2 x 5 1/2	36x4	36x7	W
Autocar, 26-B	5	4100	4 1/2 x 5 1/2	34x6	36x12	D	Dependable, G	3 1/2	3550	4 1/2 x 5 1/2	36x6	36x7	W	Harvey, WFA	2 1/2	2950	4 1/2 x 5 1/2	36x4	36x7	W
Available, H1 1/2	1 1/2	2475	4 x 5 1/2	36x3 1/2	36x5	W	Diamond T, O-3	1-1 1/4	1975	3 1/2 x 5 1/2	36x3 1/2	36x4	W	Harvey, WHA	3 1/2	3950	4 1/2 x 5 1/2	36x5	36x5d	W
Available, H2	2	2775	4 x 5 1/2	36x3 1/2	36x6	W	Diamond T, FS	1 1/2	2525	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Hawkeye, K	1 1/2	1850	3 1/2 x 5 1/2	34x3 1/2	34x5	I
Available, H2 1/2	2 1/2	3160	4 x 5 1/2	36x4	36x8	W	Diamond T, T	2	2650	4 x 5 1/2	36x4	36x7	W	Hawkeye, M	2	2650	4 1/2 x 5	36x4	36x6	I
Available, H3 1/2	3 1/2	4175	4 1/2 x 5 1/2	36x5	40x5d	W	Diamond T, U	3 1/2	3750	4 1/2 x 5 1/2	36x5	36x5d	W	Hawkeye, N	3 1/2	3700	4 1/2 x 5 1/2	36x5	36x10	I
Available, H5	5	5375	4 1/2 x 5	36x6	40x12	W	Diamond T, K	5	4325	4 1/2 x 5 1/2	36x6	40x6d	W	Hendrickson, O	1 1/2	2000	3 1/2 x 5 1/2	36x4 1/2	36x5 1/2	W
Avery	1	.....	3 x 4	34x5 1/2	34x5 1/2	I	Diamond T, S	5	4500	4 1/2 x 5	36x6	40x6d	W	Hendrickson, M	3 1/2	3000	4 1/2 x 5	36x5	36x5d	W
Beck, A Jr.	1	1950	3 1/2 x 5	34x3 1/2	34x4	I	Diehl, A	1 1/2	.....	3 1/2 x 5	34x4 1/2	35x5	I	Hendrickson, K	5	4000	5 x 6 1/2	36x6	40x6	W
Beck, C	2	2550	3 1/2 x 5	34x3 1/2	36x6	I	Diehl, B	1 1/2	.....	3 1/2 x 5	34x4 1/2	35x5	I	Huffman, B	1 1/2	1995	3			



## Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES	Final Drive
				Front Rear						Front Rear						Front Rear	
Kimball, AB	2	\$3675	4 x 6	36x4 36x7	W	O. K., M1	3 1/2	\$4250	4 1/2 x 6	36x5 36x5d	W	Signal, J	2 1/2	\$2875	4 1/2 x 5 1/2	34x4 36x8	W
Kimball, AC	2 1/2	3975	4 1/2 x 6	36x4 36x8	W	Ogden, D	1 1/2	....	3 1/2 x 5	36x3 1/2 36x5	W	Signal, M	3 1/2	3675	4 1/2 x 5 1/2	36x5 40x5d	W
Kimball, AK	3	4500	4 1/2 x 6	36x4 36x10	W	Ogden, D	1 1/2	....	3 1/2 x 5	36x3 1/2 36x5	W	Signal, R	5	4400	4 1/2 x 5 1/2	36x6 40x5d	W
Kimball, AE	4	5000	4 1/2 x 6	36x5 40x12	W	Ogden, E	2 1/2	....	4 1/2 x 5 1/2	36x4 36x8	W	Southern, 10	1	2090	3 1/2 x 5	34x3 1/2 34x4	W
Kimball, AF	5	5500	5 x 6	36x6 40x7d	W	Old Hickory, W	1	1775	3 1/2 x 5	36x3 1/2 36x4	W	Southern, 15	1 1/2	2590	3 1/2 x 5 1/2	36x6 34x4	W
Kissel, Express	1	1935 1/2	3 1/2 x 5 1/2	34x5 34x5 1/2	W	Old Reliable, A	1 1/2	2350	4 x 5	34x4 36x6	W	Southern, 20	2	2990	4 1/2 x 5 1/2	36x6 40x8	W
Kissel, Utility	1 1/2	1975	3 1/2 x 5 1/2	36x3 1/2 36x5	W	Old Reliable, B	2 1/2	3500	4 1/2 x 6	34x4 36x4d	W	Standard, 1-K	1 1/2	1600	3 1/2 x 5	34x3 1/2 34x5	W
Kissel, Freight	2 1/2	2875	4 1/2 x 5 1/2	36x4 36x7	W	Old Reliable, C	3 1/2	4250	4 1/2 x 6	36x5 36x5d	W	Standard, 76	2 1/2-3	2400	4 1/2 x 5 1/2	36x4 36x7	W
Kissel, H. D.	4	3675	4 1/2 x 5 1/2	36x5 36x5d	W	Old Reliable, D	5	5250	4 1/2 x 6	36x6 40x6d	W	Standard, 66	3 1/2-5	3150	4 1/2 x 5 1/2	36x5 36x10	W
Kleiber, AA	1	2000	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Old Reliable, KLM	7	6000	4 1/2 x 6 1/2	36x6 40x7d	C	Standard, 5-K	5-7	4400	4 1/2 x 5 1/2	36x6 40x12	W
Kleiber, A	1 1/2	3100	4 1/2 x 5 1/2	36x3 1/2 36x6	W	Olympic, A	1	1095	3 1/2 x 5	35x5 1/2 35x5 1/2	W	Sterling, 1 1/2	1 1/2	2885	4 x 5 1/2	36x3 1/2 36x5	W
Kleiber, BB	2	3600	4 1/2 x 5 1/2	36x4 36x7	W	Olympic, B	2 1/2	3200	4 1/2 x 5 1/2	36x4 36x8	W	Sterling, 2	2	3085	4 x 5 1/2	36x4 36x6	W
Kleiber, B	2 1/2	3950	4 1/2 x 5 1/2	36x5 36x8	W	Oshkosh, A	2	3750	3 1/2 x 5	36x6 36x6 1/2	4	Sterling, 2 1/2	2 1/2	3290	4 1/2 x 5 1/2	36x4 36x4d	W
Kleiber, C	3 1/2	4000	4 1/2 x 5 1/2	36x5 36x5d	W	Oshkosh, AA	2 1/2	3850	3 1/2 x 5	36x6 36x6 1/2	4	Sterling, 3 1/2	3 1/2	4325	4 1/2 x 5 1/2	36x5 40x2d	W
Kleiber, D	5	5300	5 x 6 1/2	36x6 40x12	W	Oshkosh, BB	2 1/2	4150	4 x 5 1/2	38x7 38x7 1/2	4	Sterling, 5-W	5	4950	5 x 6 1/2	36x6 40x6d	W
Koehler, D	1 1/2	1995	3 1/2 x 5	34x3 1/2 34x5	W	Oshkosh, BB	2 1/2	4300	4 x 5 1/2	38x7 38x7 1/2	4	Sterling, 5-C	5	5500	5 x 6 1/2	36x6 40x6d	W
Koehler, M	2 1/2	3175	4 x 5 1/2	36x4 36x7	W	Packard, ED	1 1/2-3	3100	4 1/2 x 5 1/2	36x6 40x8 1/2	W	Sterling, 7 1/2	7 1/2	6000	5 x 6 1/2	36x6 40x7d	W
Koehler, MCS	2 1/2	3275	4 x 5 1/2	36x4 36x7	W	Packard, EX	1 1/2-3	3100	4 1/2 x 5 1/2	36x6 40x8 1/2	W	Stewart, 14	1 1/2	1195	3 1/2 x 5 1/2	32x4 1/2 32x4 1/2	I
Koehler, F	3 1/2	4150	4 1/2 x 5 1/2	36x5 36x10	W	Packard, ED	2 1/2-4	4100	4 1/2 x 5 1/2	36x5 36x5d	W	Stewart, 15	1 1/2	1395	3 1/2 x 5 1/2	32x4 1/2 32x4 1/2	I
Koehler, MT, Trac	5	3275	4 x 5 1/2	36x4 36x7	W	Packard, EF	4 1/2-7 1/2	4500	5 x 5 1/2	36x6 40x6d	W	Stewart, 9	1 1/2	1700	3 1/2 x 5	34x3 1/2 34x5	I
Lange, B	2 1/2	3350	4 1/2 x 5 1/2	36x4 36x7	W	Paige, 52-19	1 1/2	1950	4 x 5 1/2	34x3 1/2 34x5	W	Stewart, 7	2	2090	3 1/2 x 5	34x4 34x7	I
Larrabee, X-Z	1	1925	3 1/2 x 5 1/2	34x5 34x5 1/2	W	Paige, 54-20	2 1/2	2420	4 1/2 x 5 1/2	34x4 34x8	W	Stewart, 7-X	2 1/2	2290	4 1/2 x 5 1/2	34x4 34x7	I
Larrabee, U	1 1/2	2400	3 1/2 x 5 1/2	34x3 1/2 34x5	W	Paige, 51-18	3 1/2	3145	4 1/2 x 5 1/2	36x5 36x5d	W	Stewart, 10	3 1/2	3090	4 1/2 x 5 1/2	36x5 36x5d	I
Larrabee, K	2 1/2	3200	4 1/2 x 5 1/2	36x4 36x7	W	Parker, F20	2	3500	4 x 5	34x4 38x4d	W	Stewart, 10-X	3 1/2	3850	4 1/2 x 5	36x5 36x5d	I
Larrabee, L-4	3 1/2	4000	4 1/2 x 5 1/2	36x5 36x5d	W	Parker, J20	3 1/2	4400	4 1/2 x 6	36x5 40x5d	W	Stoughton, C	1 1/2	1240	3 1/2 x 5	34x4 1/2 34x4 1/2	W
Larrabee, W	5	4800	4 1/2 x 6	36x6 40x6d	W	Parker, M20	5	5500	4 1/2 x 6	36x6 40x6d	W	Stoughton, A	1	1995	3 1/2 x 5 1/2	34x4 1/2 35x5 1/2	W
Luedinghaus, C	1	1690	3 1/2 x 5	35x5 1/2 35x5 1/2	W	Patriot, Revere	1	1500	3 1/2 x 5	35x5 1/2 35x5 1/2	W	Stoughton, B	1 1/2	2350	4 1/2 x 5 1/2	36x3 1/2 36x5	W
Luedinghaus, W	1 1/2	2490	3 1/2 x 5 1/2	34x3 1/2 34x5	W	Patriot, Lincoln	2	2050	4 x 5 1/2	34x3 1/2 34x5	W	Stoughton, D	2	2800	4 x 5 1/2	36x4 36x7	W
Luedinghaus, K	2-2 1/2	2790	4 1/2 x 5 1/2	36x4 36x7	W	Patriot, Wash'tn	3	2900	4 1/2 x 5 1/2	36x4 36x7	W	Stoughton, F	3	3600	4 1/2 x 5 1/2	36x5d 36x5d	W
Maccar, L	1 1/2	2700	4 1/2 x 5 1/2	36x4 36x6	W	Piedmont, 4-30	1	1200	3 1/2 x 5	34x4 34x4 1/2	W	Sullivan, E	2	2800	4 1/2 x 5 1/2	36x4 36x7	W
Maccar, H-A	2	3100	4 1/2 x 5 1/2	36x4 36x4d	W	Pierce-Arrow	2	3200	4 x 5 1/2	36x4 36x4d	W	Sullivan, H	3 1/2	3750	4 1/2 x 5 1/2	36x5 36x5d	W
Maccar, H-2	3	3400	4 1/2 x 5 1/2	36x4 36x5d	W	Pierce-Arrow	3 1/2	4350	4 1/2 x 5 1/2	36x5 36x5d	W	Superior, D	1	1650	3 1/2 x 5	34x4 34x4 1/2	I
Maccar, H-3	4	4200	4 1/2 x 5 1/2	36x5 36x6d	W	Pierce-Arrow	5	4850	4 1/2 x 5 1/2	36x5 40x6d	W	Superior, E	2	2600	4 1/2 x 5 1/2	36x4 36x6	I
Maccar, G	5-6	4950	4 1/2 x 6	36x5 40x6d	W	Pioneer, 59	1	1550	3 1/2 x 5 1/2	32x4 1/2 32x4 1/2	W	Super Truck, 50	2 1/2	3300	4 x 6	36x4 36x8	W
MacDonald, A	7 1/2	5750	4 1/2 x 6	40x7 40x14	I	Pittsburgher	1 1/2-2	3800	4 1/2 x 5 1/2	36x5 36x8	W	Super Truck, 70	3 1/2	4300	4 1/2 x 6	36x5 40x6d	W
Mack, AB, D.R.	1 1/2	3450	4 x 5	36x4 36x3 1/2d	D	Pittsburgher	3	3800	4 1/2 x 5 1/2	36x5 36x8	W	Super Truck, 100	5	5300	4 1/2 x 6	36x6 40x12	W
Mack, AB Chain	1 1/2	3000	4 x 5	36x4 36x3 1/2d	D	Power, F	2	3150	4 1/2 x 5 1/2	36x5 36x7	W	Super Truck, 150	7 1/2	6300	5 x 6	36x6 40x7d	W
Mack, AB Chain	2	3300	4 x 5	36x4 36x4d	C	Power, C	3 1/2	4250	4 1/2 x 5 1/2	36x5 40x10	W	Texas, A38	1 1/2	1095	3 1/2 x 5	33x4 33x4	I
Mack, AB, D.R.	2	3750	4 x 5	36x4 36x4d	C	Premecar, B-143	1 1/2	2475	3 1/2 x 5	36x6 36x6 1/2	W	Texas, TK39	1 1/2	1550	3 1/2 x 5	36x6 38x7	W
Mack, ABDR	2 1/2	3850	4 x 5	36x4 36x4d	D	Rainier, R-21	1 1/2	1990	3 1/2 x 5	35x5 1/2 35x5 1/2	W	Thermast-Transport	1 1/2	1795	4 x 5 1/2	34x5 34x5	B
Mack, AB	2 1/2	3400	4 x 5	36x4 36x4d	C	Rainier, R-19	1 1/2	2150	3 1/2 x 5	34x3 1/2 34x5	W	Tiffin, GW	1 1/2	2100	4 1/2 x 5 1/2	36x3 1/2 36x5	W
Mack, AC Chain	3 1/2	4950	5 x 6	36x5 40x5d	C	Rainier, R-16	1 1/2	2490	3 1/2 x 5	34x3 1/2 34x5	W	Tiffin, MW	2 1/2	2700	4 1/2 x 5 1/2	36x4 36x3 1/2d	W
Mack, AC Chain	5	5500	5 x 6	36x6 40x6d	C	Rainier, R-18	2	2890	4 1/2 x 5 1/2	34x4 34x6	W	Tiffin, PW	3 1/2	3600	4 1/2 x 5 1/2	36x5 40x5d	W
Mack, AC Chain	6 1/2	5750	5 x 6	36x6 40x12	C	Rainier, R-20	2 1/2	3550	4 1/2 x 5 1/2	34x4 34x7	W	Tiffin, F50	5	4300	4 1/2 x 6	36x6 40x6d	W
Mack, AC Chain	7 1/2	6000	5 x 6	36x7 40x7d	C	Rainier, R-15	3 1/2	4400	4 1/2 x 5 1/2	36x5 36x5d	W	Tiffin, F60	6	4500	4 1/2 x 6	36x6 40x12	W
Mack Trac, AB	5	3400	4 x 5	36x4 36x4d	C	Rainier, R-17	5	5100	4 1/2 x 6	36x6 36x6d	W	Titan	2	2950	4 1/2 x 5 1/2	34x4 36x7	I
Mack Trac, AC	7	4950	5 x 6	36x5 40x5d	C	Ranger, TK-22-2	2	2775	3 1/2 x 5	36x6 36x7	W	Titan	3 1/2	3950	4 1/2 x 5 1/2	36x5 40x10	I
Mack Trac, AC	10	5500	5 x 6	36x6 40x6d	C	Rep, F	1 1/2	1245	4 1/2 x 5 1/2	34x4 34x4 1/2	W	Titan	6	4550	4 1/2 x 6	36x5 40x6d	I
Mack Trac, AC	13	5750	5 x 6	36x6 40x12	C	Reliance, 10A	1 1/2	2400	4 x 5 1/2	36x3 1/2 36x5	I	Titan, 6-Ton	6	5150	4 1/2 x 6	36x5 40x12	I
Mack Trac, AC	15	6000	5 x 6	36x7 40x7d	C	Reliance, 20B	2 1/2	3100	4 1/2 x 5 1/2	36x4 36x4d	I	Tower, J	1 1/2	2900	4 1/2 x 5 1/2	36x5 38x7	W
Mapleleaf, AA**	2	3775	4 x 5 1/2	36x4 36x7	W	Republic, 75	1	1395 1/2	3 1/2 x 5	32x4 1/2 32x4 1/2	I	Tower, H	2 1/2	3200	4 1/2 x 5 1/2	36x4 36x7	W
Mapleleaf, BB**	3	4350	4 1/2 x 5 1/2	36x4 36x4d	W	Republic, 10	1	1395	3 1/2 x 5	34x3 34x4	I	Tower, G	3 1/2	4100	4 1/2 x 5 1/2	36x5 36x5d	W
Mapleleaf, CC**	4	5100	4 1/2 x 5 1/2	36x5 36x5d	W	Republic, 10Exp.	1	1695	3 1/2 x 5	35x5 1/2 34x5 1/2	I	Traffic, C	1	1595	3 1/2 x 5	34x3 1/2 34x5	I
Mapleleaf, DD**	5	6200	4 1/2 x 5 1/2	36x6 40x6d	W	Republic, 11X	1 1/2	1795	3 1/2 x 5	34x3 1/2 34x6	I	Traffic, E	1	1895	3 1/2 x 5	36x4 36x7	I
Master, JW	1 1/2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Republic, 19	2 1/2	2195	4 1/2 x 5 1/2	36x4 36x7	I	Transport, 20	1	1395	3 1/2 x 5	34x3 1/2 34x4	I
Master, JD	1 1/2	2590	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Republic, 19	2 1/2	2195	4 1/2 x 5 1/2	36x4 36x7	I	Transport, 30	1 1/2	1995	3 1/2 x 5	36x3 1/2 36x5	I
Master, Z	2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Republic, 20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x10	I	Transport, 50	2 1/2	2785	4 1/2 x 5 1/2	36x4 36x7	I
Master, W	2 1/2	2890	4 1/2 x 5 1/2	34x4 36x7	W	Rowe, CW	1 1/2	3000	3 1/2 x 5	36x6 36x6 1/2	W	Transport, 70	3 1/2	3885	4 1/2 x 6	36x5 36x10	I
Master, DD	2 1/2	3190	4 1/2 x 5 1/2	34x4 36x7	D	Rowe, C. D. W.	2	3300	4 x 5	34x4 36x3 1/2d	W	Traylor, B	2 1/2	2390	3 1/2 x 5 1/2	34x3 1/2 34x5	W
Master, A	3 1/2	3990	4 1/2 x 6	36x5 40x5d	W	Rowe, G. S. W.	3	4150	4 x 5	34x5 36x5d	W	Traylor, C	2	2850	4 x 5 1/2	36x4 36x7	W
Master, E	3 1/2	4290	4 1/2 x 6	36x5 40x5d	D	Rowe, G. P. W.	4	4500	4 1/2 x 6	36x5 36x6d	W	Traylor, D	3	2300	4 1/2 x 5 1/2	36x4 36x8	W
Master, Y	4	4490	4 1/2 x 6														

## Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Walter, S	5	\$4850	4 1/2 x 6 1/2	36x6	40x6d	W	Wichita, RX	3	\$3500	4 1/2 x 6 1/2	36x4	36x8	W	Winther, 430	1 1/2	\$2850	3 1/2 x 5	32x4	32x4	1
Ward-LaF., 2B	2 1/2	2390	3 1/2 x 5 1/2	36x4	36x4d	W	Wichita, O	4	3900	4 1/2 x 6 1/2	36x5	36x5d	W	Winther, 39	1 1/2	2450	3 1/2 x 5	34x3 1/2	34x5	1
Ward-LaF., 4A	3 1/2	3393	4 1/2 x 6 1/2	36x5	36x5d	W	Wilcox, AA	1	1900	3 1/2 x 5 1/2	36x4	36x4	W	Winther, 49	2	3250	4 x 5	34x4	34x4d	1
Ward-LaF., 5A	5	4393	5 x 6 1/2	36x6	40x6d	W	Wilcox, BB	1 1/2	2550	4 1/2 x 6 1/2	36x4	36x5	W	Winther, 50	2 1/2	3995	4 x 6	38x7 1/2	42x9 1/2	1
Watson, B	1	1635	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	W	Wilcox, D	2 1/2	3000	4 1/2 x 6 1/2	36x4	36x3 1/2d	W	Winther, 70	3 1/2	4 00	4 x 6	36x5	36x5d	1
Watson, N	3 1/2	3325	4 1/2 x 6 1/2	36x5	36x10	W	Wilcox, E	3 1/2	3950	4 1/2 x 6 1/2	36x5	36x5d	W	Winther, 450	2 1/2	3690	4 x 5	34x5	36x6	1
Western, W1 1/2	1 1/2	2550	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Wilcox, F	5	4350	4 1/2 x 6 1/2	36x5	40x6d	W	Winther, 109	5	5250	4 1/2 x 6	36x6	40x6d	1
Western, W1 3/4	1 3/4	2550	3 1/2 x 5 1/2	36x4	36x5	W	Wilson, F	1 1/2	2270	3 1/2 x 5 1/2	36x4	36x5	W	Winther, 140	7	5900	5 x 6	36x6	40x7d	1
Western, W2 1/2	2 1/2	3250	4 1/2 x 6 1/2	36x4	36x7	W	Wilson, EA	2 1/2	2825	4 1/2 x 6 1/2	36x4	36x7	W	Wisconsin, B	1	1750	3 1/2 x 5	34x5 1/2	34x5 1/2	W
Western, W2 3/4	2 3/4	3250	4 1/2 x 6 1/2	36x4	36x7	W	Wilson, G	3 1/2	3685	4 1/2 x 6 1/2	36x5	36x5	W	Wisconsin, C	1 1/2	2503	4 x 5 1/2	36x6	36x6	W
Western, W3 1/2	3 1/2	4250	4 1/2 x 6 1/2	36x5	40x5d	W	Wilson, H	5	4520	4 1/2 x 6	36x6	40x6	W	Wisconsin, F	2	3000	4 1/2 x 5 1/2	38x7	40x8	W
White, 15	3 1/2	2100	3 1/2 x 5 1/2	34x5 1/2	34x5 1/2	B	Winther, 751	1	1795	3 1/2 x 5	34x4 1/2	35x5	I	Wisconsin, D	2 1/2	3500	4 1/2 x 6 1/2	36x6	36x10	W
White, 20	2	3250	3 1/2 x 5 1/2	36x4	36x7	D								Wisconsin, E	3 1/2	4000	5 x 6 1/2	36x6	36x12	W
White, 40	3 1/2	4200	4 1/2 x 6 1/2	36x5	40x5d	D								Witt-Will, N	1 1/2	2250	3 1/2 x 5	36x5 1/2	36x5 1/2	W
White, 45	5	4500	4 1/2 x 6 1/2	36x6	40x6d	D								Witt-Will, P	2 1/2	2750	4 1/2 x 5 1/2	36x5 1/2	36x5 1/2	W
White Hick., E	1	1225	3 1/2 x 5	34x5	34x5 1/2	D								Wolverine, J	1	2125	3 1/2 x 5	34x3	34x4	1
White Hick., H	1 1/2	1375	3 1/2 x 5	36x3 1/2	36x5	W								Wolverine, J	1 1/2	2375	3 1/2 x 5	34x3 1/2	34x5	1
White Hick., K	1 1/2	1675	3 1/2 x 5	36x4	36x5	W								Wolverine, J	2	2640	3 1/2 x 5	34x4	34x7	1
Wichita, K	2 1/2	2000	3 1/2 x 5 1/2	36x3	36x4	W								Wolverine, J	2 1/2	3425	4 1/2 x 5 1/2	36x5	36x10	1
Wichita, M	2	2500	3 1/2 x 5 1/2	36x3 1/2	36x6	W								Wolverine, L	3 1/2	4100	4 1/2 x 5 1/2	36x5	36x10	1

\*2-cyl. 16-cyl. 18-cyl. All others, not marked, are 4-cyl.  
 Trac., Tractor. \*\*Canadian made.  
 Final Drive: W—Worm, I—Internal Gear, C—Chain, D—Double Reduction, B—Belt, 4—Four-Wheel, E—External Gear. \*Tires—optional. †Pneumatic Tires. All others solid.  
 †Price includes body. \$—Price includes several items of equipment.

## Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity
All-In One.....	15-30	\$1075	3	Weid.	4-4 x 5 1/2	GDK	2-3	Frick.....A	12-20	.....	4	Erd.	4-4 x 6	G,K	2-3	Pioneer.....C	40-75	\$3550	4	Own	4-7 x 8	Gas.	10
Allis-Chalm. B	6-12	.....	2	Leit.	4-3 1/2 x 4 1/2	Gas.	1	Frick.....C	15-28	.....	4	Beav.	4-4 1/2 x 6	G,K	3-4	Playman.....A	15-30	1295	4	Buda	4-4 1/2 x 6	G,K	3-4
Allis-Chalm. G.P.	15-25	1350	3	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Grain Belt.....	18-30	\$2150	4	Wauk.	4-4 1/2 x 6	G or K	4	Port Huron.....A	12-25	1500	4	Chief	4-3 1/2 x 6	G,K	3
Allis-Chalm. H	20-35	1885	4	Own	4-4 1/2 x 6 1/2	GorK	3-4	Gray.....1920	18-36	2000	3	Wauk.	4-4 1/2 x 6	G,K	3	Ranger Cul. T-20	8-10	.....	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1
Allis-Chalm. I	20-35	2085	4	Own	4-4 1/2 x 6 1/2	G,K	4	Gray.....1920	18-36	2000	3	Wauk.	4-4 1/2 x 6	G,K	3	Reliable.....	10-20	685	4	Own	2-6 x 7	Ker.	2
Allwork.....2-G	14-28	1695	4	Own	4-4 1/2 x 6	GorK	3	Ground Hog.....	19-31	2000	4	Erd.	4-4 x 6	G or K	3	Rex.....	12-25	1600	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3
Allwork.....C	14-28	1395	4	Own	4-5 x 6	GorK	3	Gt. Western Si.....	20-30	1950	4	Beav.	4-4 1/2 x 6	K	4	Russell.....	15-30	2200	4	Own	4-4 1/2 x 5 1/2	G or K	2-3
AndrewsKin.D	18-36	2500	4	Clim.	4-5 x 6 1/2	GorK	4	Hart-Parr.....20	20	945	4	Own	2-5 1/2 x 6 1/2	K,D	2	Russell.....	20-35	3000	4	Own	4-5 x 6 1/2	G or K	3-4
Appleton.....	12-20	1500	4	Buda	4-4 1/2 x 5 1/2	G,K	2-3	Hart-Parr.....30	20	1295	4	Own	2-6 1/2 x 7	K,D	3	Russell.....	30-60	5000	4	Own	4-8 x 10	G or K	8-10
ARO.....1921-22	3-5	385	4	Own	1-4 1/2 x 5	Gas.	1	Heider.....D	9-15	870	4	Wauk.	4-4 1/2 x 6	G,K	4	Samsen.....M	10-20	1250	4	Own	4-4 x 5 1/2	G,K	2
Aultman-T.....	15-30	2200	4	Clim.	4-5 x 6 1/2	G,K	4	Heider.....30	12-20	900	4	Wauk.	4-4 1/2 x 6	G,K	3	Sandusky.....J	10-20	1250	4	Own	4-4 1/2 x 5 1/2	G,K,D	2
Aultman-T.....	22-45	3420	4	Own	4-5 1/2 x 8	G,K	6	Heider.....Colt	5-10	800	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Sandusky.....E	15-35	1750	4	Own	4-5 x 6 1/2	G,K,D	4
Aultman-T.....	30-60	4500	4	Own	4-7 x 9	G,K,D	9-10	Huber Light 4.....	12-25	1185	4	Wauk.	4-4 1/2 x 6	G or K	3	Shelby.....D	15-30	.....	4	Beav.	4-4 1/2 x 6	G,K	3
Automot. B-3	12-24	1785	4	Here.	4-4 x 5 1/2	Gas.	2-3	Huber Super 4.....	15-30	1885	4	Wauk.	4-4 1/2 x 6	G or K	3	Shelby.....C	9-18	.....	4	Wauk.	4-3 1/2 x 5 1/2	G or K	2
Avery, SR, Cul.	5-10	.....	4	Own	4-3 x 4	G,K	2	Illinois, Super-Drive.....C	15-30	.....	4	Clim.	4-5 x 6 1/2	G,K	4	Short Turn.....	20-40	1500	3	Beav.	4-4 x 5	Gnn.	3
Avery, Cult-C	5-10	.....	3	Own	4-3 x 4	G,K	2	Imperial.....E	40-70	4500	4	LeR.	4-7 1/2 x 9	G,K,D	10	Steady Pull.....	12-24	1485	4	Own	4-4 1/2 x 6	G,K	3
Avery.....B	5-10	.....	4	Own	2-5 1/2 x 6	G,K,D	2-3	Indiana.....F	5-10	665	2	Own	4-4 1/2 x 6 1/2	Gas.	1-2	Stinson.....4E	18-36	1835	4	Beav.	4-4 1/2 x 6	G,K	4
Avery.....C	5-10	.....	4	Own	4-4 1/2 x 6	G,K,D	3-4	International.....	8-16	1670	4	Own	4-4 1/2 x 6	G,K,D	2	Toga.....3	15-27	1985	4	Winc.	4-4 1/2 x 6	Gas.	3-4
Avery.....C	12-20	.....	4	Own	4-4 1/2 x 6	G,K,D	3-4	International Titan	10-20	1700	4	Own	4-5 1/2 x 8	G,K,D	4	Top.....	30-45	3500	4	Wauk.	4-4 1/2 x 6 1/2	Gas.	3-4
Avery.....C	12-25	.....	4	Own	2-6 1/2 x 7	G,K,D	3-4	International.....	15-30	1500	2	Own	4-4 1/2 x 6	G,K,D	3	Toro Cultivator	6-10	750	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
Avery.....C	14-28	.....	4	Own	4-4 1/2 x 6	G,K,D	3-4	J-T.....N	20-40	.....	2	Chief.	4-4 1/2 x 6	G,K,D	3-4	Toro Tractor 22	6-10	495	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2
Avery.....C	18-36	.....	4	Own	4-5 1/2 x 6	G,K,D	4-5	Knudsen.....M	25-45	2500	4	Own	4-5 1/2 x 9	Gas.	4-6	Townsend.....	10-20	750	2	Own	4-0 1/2 x 7	Ker.	2-3
Avery.....C	25-50	.....	4	Own	4-6 1/2 x 7	G,K,D	5-6	LaCrosse.....20	6-12	650	4	Own	2-4 x 6	G,K	1	Townsend.....	15-30	1350	2	Own	4-7 x 8	Ker.	3-4
Avery.....C	45-65	.....	4	Own	4-7 1/2 x 8	G,K,D	8-10	LaCrosse.....G	12-24	985	4	Own	2-6 x 7	G or K	3-4	Townsend.....	25-50	2500	2	Own	4-8 1/2 x 10	Ker.	4-8
Bates.....	15-25	.....	4	Own	4-4 1/2 x 6	Ker.	3	Lauson.....5	12-25	1495	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Traction Motor	40-50	.....	4	Own	8-3 x 15	Gas.	4-5
Bates Mule. H	15-25	.....	4	Midw	4-4 1/2 x 5 1/2	Gas.	3	Lauson.....20	15-30	1985	4	Beav.	4-4 1/2 x 6	G or K	3-4	Traylor.....TB	6-12	715	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2
Bates Mule. F	18-25	.....	2	Midw	4-4 1/2 x 5 1/2	Gas.	3	Lauson.....21	15-30	1985	4	Beav.	4-4 1/2 x 6	G or K	3-4	Triumph.....H	18-36	2450	2	Erd.	4-4 1/2 x 6	Ker.	4
Bates Mule, G	25-35	.....	2	Midw	4-4 1/2 x 6	Gas.	..	Lauson.....21	15-30	1985	4	Beav.	4-4 1/2 x 6	G or K	3-4	Trundaar.....10	25-40	3750	2	Wauk.	4-5 x 6 1/2	G or K	4
Beeman.....G	2-4	240	4	Own	1-3 1/2 x 4 1/2	Gas.	..	Lauson Lead.....	15-30	2225	4	Beav.	4-4 1/2 x 6	K	4	Turner.....1921	14-25	1295	4	Buda	4-4 1/2 x 5 1/2	G,K	3
Best.....	18-30	3100	2	Own	4-4 1/2 x 6 1/2	G,K,D	4	Leader.....B	12-18	685	4	Own	2-6 x 6 1/2	G,K,D	2-3	Twin City.....	12-20	1395	4	Own	4-4 1/2 x 6	G,K	3
Best.....	60	5450	2	Own	4-6 1/2 x 8 1/2	G,K,D	8-9	Leader.....M	16-32	1725	4	Clim.	4-5 x 6 1/2	G,K	3-4	Twin City.....	20-35	2950	4	Own	4-5 1/2 x 6 1/2	G,K	5
Boring.....1921	15-30	1850	3	Wauk	4-4 1/2 x 5 1/2	GorK	2	Leader.....GU	18-36	2150	2	Clim.	4-5 x 6 1/2	G,K	3-4	Twin City.....	40-65	4750	4	Own	4-7 1/2 x 9	G,K	8
Burn-Oil, 1922	15-30	1435	4	Own	2-6 1/2 x 7	Ker.	3-4	Leonard.....E	20-30	2530	4	Buda	4-4 1/2 x 6	G,K	3	Uncle Sam C20	12-20	1385	4	Weid.	4-4 x 5 1/2	G	2-3
Capital.....	15-30	1000	2	Own	4-4 1/2 x 6	Gas.	3	Linn.....H.J	40	5000	4	Cont.	4-4 1/2 x 6 1/2	Gas.	4	Uncle Sam B19	20-30	2300	4	Beav.	4-4 1/2 x 6	G or K	3-4
Case.....	10-18	700	2	Own	4-3 1/2 x 6	Gas.	3	Linn.....W	60	5000	4	Wauk.	4-5 x 6 1/2	K	4	Uncle Sam D21	20-30	1985	4	Beav.	4-4 1/2 x 6	G or K	3-4
Case.....	15-27	1420	4	Own	4-4 1/2 x 6	GorK	3-4	Little Giant, B	16-22	2200	4	Own	4-5 1/2 x 6	K	6	Universal.....	1-4	475	2	Own	1-3 1/2 x 4 1/2	G	1
Case.....	22-40	2550	4	Own	4-5 1/2 x 6 1/2	GorK	4-5	Little Giant, A	26-35	3300	4	Own	4-5 1/2 x 6	K	6	Utilitor.....501	24	295	4	Own	1-3 1/2 x 4 1/2	G	1
Case.....40-72	40-72	.....	4	Own	7 x 8	Gas.	8-10	Lombard, 1921	85	1500	2	2	6-5 1/2 x 6 1/2	Gas.	16	Wallis.....K	15-25	1995	4	Own	4-4 1/2 x 5 1/2	G,K	3
Caterpillar T11	25	3975	2	Own	4-4 1/2 x 6	G,K,D	4	Lombard, 1921	50	1500	2	2	4-4 1/2 x 6 1/2	Gas.	16	Waterloo.....N	12-25	675	4	Own	2-6 1/2 x 7	G,K	3
Caterpillar T16	40	6050	2	Own	4-6 1/2 x 7	Gas.	6	Magnet.....B	14-28	1875	4	Wauk.	4-4 1/2 x 6 1/2	K&G	3	Webfoot.....53	28-53	5000	2	Wise.	4-5 1/2 x 7	G,D	6
Centaur.....	5-2 1/2	385	2	N Way	2-4 1/2 x 4 1/2	GorK	1	Master Jr.....	5-10	585	2	Light	4-7 1/2 x 9	G or K	8-9	Wellington.....B	12-22	.....	4	Erd.	1-4 x 6	Ker.	2-3
Chase.....	12-25	1725	3	Buda	4-4 1/2 x 5 1/2	GorK	2-3	Merry-Gar1922	2	210	2	Own	4-3 1/2 x 5	Gas.	2-3	Wellington.....F	16-30	.....	4	Chief	4-4 1/2 x 6	Ker.	3-4
Chicago.....40	40	2500	4	Own	4-4 1/2 x 6	Gas.	4	Minne.....All-P	12-25	900	4	Own	4-3 1/2 x 5	Gas.	2-3	Western.....1920	16-32	2100	4	Clim.	4-5 x 6 1/2	Gas.	4
Cietrac.....	9-16	795	2	Own	4-3 1/2 x 4 1/2	G,K,D	2-3	Minne.....Gen-P	17-30	1675	4	Own	1-2 1/2 x 3 1/2	Gas.	1	Wetmore21-22	15-25	1185	4	Wauk.	4-4 x 5 1/2	G,K	3
Cietrac.....W	12-20	1315	2	Own	4-4 x 5 1/2	G,K,D	2-3	Minne.....	1	195	2	Own	4-4 1/2 x 6	Gas.	3-4	Whitney.....D	9-18	595	4	Own	2-5 1/2 x 6 1/2	Gas.	2
Dakota.....4	15-27	1500	3	Dom.	4-4 1/2 x 6	Gas.	3	Med.Duty	22-44	3000	4	Own	2-3 1/2 x 4	Gas.	1	Wichita.....T	15-30	2500	4	Beav.	4-4 1/2 x 6	G,K,D	3-4
Dart.....B.J.	15-30	1800	4	Buda	4-4 1/2 x 6	Gas.	3-4	Minne.....	35-70	4150	4	Own	4-7 1/2 x 9	G or K	8-9	Wisconsin.....E	16-30	1850	4	Clim.	4-5 x 6 1/2	G or K	3
Depue.....A	20-30	2500	4	Buda	4-4 1/2 x 6	Gas.	3	Heavy Duty	8-16	735	2	Light	4-3 1/2 x 5	Gas.	2-3	Wisconsin.....F	20-40	2050	4	Wauk.	4-5 x 6 1/2	G or K	4
Dill.....D	20	2340	4	Cont.	4-4 1/2 x 5 1/2	Gas.	3	Mohawk 1921	9-18	990	2	Own	1-2 1/2 x 3 1/2	Gas.	1	Wisconsin.....H	22-40	2550	4	Chim.	4-5 1/2 x 7	G or K	4-6
Dill.....R.W.	20	2980	4	Midw.	4-4 1/2 x 6	Gas.	3	Moline Univ D	9-18	990	2	Own	4-4 1/2 x 6	Gas.	2-3	Yuba.....18-20	12-20	2600	2	Wise.	4-4 1/2 x 6	G,K,D	3
Do-It-All.....A	3-6	595	5	Own	1-4 1/2 x 5	Gas.	1	Moline Orch.....	9-18	990	2	Own	4-3 1/2 x 5	Gas.	2-3	Yuba.....15-25	15-25	3100	2	Wise.	4-4 1/2 x 6	G,K,D	3
Eagle.....F	12-22	.....	4	Own	2-7 x 8	GorK	3-4	Motor Macaul.	1 1/2	195	2	Own	4-3 1/2 x 5	Gas.	2-3	Yuba.....23-35	20-35	4185	2	Wise.	4-5 1/2 x 7	G,K,D	4
Eagle.....F	16-30	.....	4	Own	2-8 x 8	GorK	4-5	Motor.....	15-30	2250	4	Buda	4-4 1/2 x 6	Gas.	3-4	Yuba.....25-40	25-40	4650	2	Wise.	4-5 1/2 x 7	G,K,D	4
E-B.....AA	12-20	1095	4	Own	4-4 1/2 x 5	G,K,D	3	NB.....1	3-6	425	4	Own	2-3 1/2 x 4	Gas.	1	Zello.....	12-25	.....	4	Buda	4-4 1/2 x 5 1/2	G or K	3
E-B.....Q	12-20	750	4	Own	4-4 1/2 x 5	G,K,D	3	Nichols.....Sh	20-42	2650	4	Own	8 x 10	G or K	3-6	ABBREVIATIONS:	G—Gasoline. K—Kerosene. D—Distillate. Flow capacity varies in relation to operating conditions. Figures are based on 14 in. flows. Engine Make: Beav.—Beaver. Clim.—Climax. Cont.—Continental. Dom.—Domas. Erv.—Evinrude. Here.—Hereules. Leit.—LeRoy. Midw.—Midwest. Nway.—New Way Nor.—Northway. Strns.—Stearns. T.C.—Twin City. Wauk.—Waukesha. Weid.—Weidely. Wis.—Wisconsin. Winc.—Crawler type. All others are wheel type. *Price						
E-B.....Q	16-32	1750	4	Own	4-5 1/2 x 7	G,K,D	4	Nichols.....Sh	20-42	2650	4	Own	8 x 10	G or K	3-6	Yuba.....18-20	12-20	2600	2	Wise.	4-4 1/2 x 6	G,K,D	3
Evans.....	18-30	2000	4	Buda	4-4 1/2 x 6	G,K	3	Nichols.....Sh	20-42	2650	4	Own	8 x 10	G or K	3-6	Yuba.....15-25	15-25	3100	2	Wise.	4-4 1/2 x 6	G,K,D	3
Fageol.....D	9-18	1825	4	Lye.	4-3 1/2 x 5	Gas.	2	Nichols.....Sh	20-42	2650	4	Own	8 x 10	G or K	3-6	Yuba.....23-35	20-35	4185	2	Wise.	4-5 1/2 x 7	G,K,D	4
Farm Horse																							



# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

Harrisburg, Pa.	Automobile Show	March
Ardmore, Okla.	Ardmore Automobile Dealers' Assn.	March
Madison, Wis.	Automobile Show	March
Denver	Denver Automobile Trade Assn.	Mar. 10-20
Boston	Annual Automobile Show	Mar. 11-18
Newark, N. J.	Newark Automobile Dealers' Assn.	Mar. 11-18
Spartansburg, S. C.	Piedmont Exposition	Mar. 13-18
Boston	Automobile Salon	Mar. 13-18
Omaha	Omaha Automobile Trade Assn.	Mar. 13-18
Great Falls, Mont.	Automobile Show	Mar. 13-18
Greensboro, N. C.	Automobile Show	Mar. 14-18
Port Huron, Mich.	Michigan Automotive Trade Assn.	Mar. 15-18
Logansport, Ind.	Automobile Show	Mar. 16-18
Torrington, Conn.	Automobile Show	Mar. 20-25
White Plains, N. Y.	Automobile Show	Mar. 20-25
Ypsilanti, Mich.	Michigan Automotive Trade Assn.	Mar. 21-22
Denver, Colo.	Automobile Show	Mar. 22-25
Herkimer, N. Y.	Automobile Show	Mar. 23-25
Kingston, N. Y.	Automobile Show	Mar. 23-25
Ann Arbor, Mich.	Michigan Automotive Trade Assn.	Mar. 24-25
Wash'ton, City of	Automobile Trade Assn.	Mar. 25-Apr. 1
Jacksonville, Ill.	Automobile Show	Mar. 27
Oklahoma City	Automobile Show	Mar. 27-Apr. 1
Torrington, Conn.	Automobile Show	Mar. 27-Apr. 1
Ben. Harbor, Mich.	Michigan Automotive Trade Assn.	Mar. 28-31
Quincy, Ill.	Automobile Show	Mar. 28-Apr. 1

Owensboro, Ky.	Automobile Show	Mar. 29-Apr. 1
Bridgeport, N. J.	Automobile Show	Apr. 1-8
Bat. Creek, Mich.	Michigan Automotive Trade Assn.	Apr. 2-8
New York City	Electric Automobile Show	Apr. 3-15
Holdrege, Neb.	Automobile Show	Apr. 5-8
Sioux Falls, S. D.	Automobile Show	Apr. 5-8
Asbury Pk., N. J.	Automobile Show	Apr. 10-15
Buffalo, N. Y.	Motors and Sportsmen's Show	Apr. 10-15
Wins. Salem, N. C.	Automobile Show	Apr. 11-17
Goldsboro, N. C.	Automobile Show	Apr. 18-22
Chicago	Used Car Show	Apr. 26-May 4
Hartford, Conn.	Automobile Show	Sept. 4-9

## FOREIGN SHOWS

Santiago, Cuba	Annual Automobile Show	March, 1922
Mexico City	Automobile Show	Apr. 16-23
Rio de Janeiro	Automotive Exhibition	Sept., 1922

## CONVENTIONS

Decatur, Ill.	3rd Annual Convention, Illinois Automotive Trade Assn.	Mar. 20
White Sulphur Springs, W. Va.	S. A. E. Summer Meeting	June 20-24
Olympia	Washington Automotive Trade Assn.	July 21-22

## RACES

Indianapolis	500-Mile Classic	May 30
San Carlos, Cal.	500-Mile Armistice Day Race	Nov. 11

## STATE INSURANCE PLAN

Albany, March 10—A bill which would create the New York Automobile Owners Mutual Compensation Assn., in which all owners of motor cars would have to be insured at cost, has been introduced in both houses of the legislature. The bill would provide compensation for persons injured or the families of those killed in automobile accidents. It is contended that not more than 25 per cent of the money which automobile owners now have to pay because of accidents ever reaches the injured persons or their families because of litigation, expenses and the profit of insurance companies.

## HENRY COUNTY ELECTS

Galesburg, Ill., March 13.—At the annual meeting of the Henry County, Ill., Automotive Dealers' Assn., officers were elected as follows: President, William Soderberg, Galva; first vice-president, Homer McMullen, Cambridge; second vice-president, C. F. Moberg, Galva; third vice-president, Frank Brown, Osco; secretary, G. R. Galloway, Kewanee; treasurer, Phillip Miller, Kewanee; directors, A. G. Fell, Kewanee, and A. D. Keller, Woodhull. In connection with the annual gathering, B. B. Burns of Decatur, Ill., delivered an address, specializing upon the used car problem.

## SACRAMENTO ASSESSMENT SCALE

Sacramento, Calif., March 13.—A scale of automobile assessment for Sacramento County has been announced by County Assessor B. C. Erwin, and has been adopted by several other counties. Instead of assessing cars on their original purchase price value, they are to be as-

sessed on the value of the same model of the make in question at the present time.

New cars are to be assessed at half the cost; year olds at one-third; two years at one-fourth; 1919 models at one-fifth; 1918 at one-sixth; 1917 at one-seventh; and older cars at \$50.

## CANADIANS PROTEST TAX LAW

Montreal, March 10—Concerted action in protest against heavy increases in motor vehicle fees was planned at emergency meetings of the Automobile Club of Canada and the Montreal Automobile Trade Assn. The taxes on passenger cars would be increased from 70 cts. per horsepower to 90 cts. and on motor trucks to \$50 per ton capacity. It was pointed out at the meeting that the tax on a Ford car, for example, would be \$26.70 under the new rate as compared with \$8.75 in New York state. The tax on a McLaughlin would be \$33.90, on a big six Studebaker \$46.50, on a Cadillac \$42.00 and on a Pierce-Arrow \$66.30.

## BANK AIDS SHAFT COMPANY

Chicago, March 14—A committee representing the holders of the \$100,000 7 per cent notes of the Jackson Motor Shaft Co. bearing a March 1 maturity date has been formed. The stock of this company is owned by Earl Motors. As soon as the notes are deposited with the Chicago Trust Co., the bank will pay the interest and make arrangements for extensions. The company is considered by bankers to be solvent but its affairs are entangled with Earl Motors. Both situations are expected to be cleared up in the near future.

## NORTHWAY UNITS AMALGAMATE

Natick, Mass., March 13.—Northway Motors Corp stockholders have voted to amalgamate the three corporations bearing the Northway name. The Northway Motors, Northway Motor Sales Corp. and Northway Motors Guarantee & Discount Corp. All the assets of the three companies were pooled with the formation of the new corporation and it was voted to issue \$400,000 eight per cent three-year gold notes and the stockholders were asked to make contributions of 10 per cent on their stock.

The plant at present is almost shut down, but it is expected to be opened this week and production started on incomplete trucks. There is material on hand amounting to \$500,000 outside the indebtedness of \$100,000. To complete 200 trucks nearly finished will take \$120,000, and when sold they will bring \$780,000. The loss last year was \$217,000.

## NOVEL WINDOW DISPLAY

Hartford, Conn., March 13.—Russell P. Taber, Inc., Reo distributor, hit upon a window display that has attracted much favorable attention. A six-cylinder Reo touring car was turned over on the side, the under body towards the window. The bottom of the crankcase was removed to show the construction. On the window were pasted numerous small cards each conveying a thought about some particular part. Various colored ribbons extended from the cards to the parts noted. A background was formed with scenery from a local theater, this finished in gold with long, swinging, dark-red silk cords. A display of parts was shown on a green-backed board.

In This Issue—Saginaw Used Car Plan

# MOTOR AGE

Vol. XLI  
Number 11

PUBLISHED WEEKLY AT THE MALLERS BUILDING  
CHICAGO, MARCH 16, 1922

Thirty-five Cents a Copy  
Three Dollars a Year

*Four vital convincing  
facts about the  
Jordan dealers propos-  
ition will interest real  
business men who want  
to make money in 1922-  
and in years to come-  
no matter what your  
present situation-  
I'll send them on  
request—*

*Edward S. Jordan  
- Cleveland -*



# Here's How NO-LEAK-O Registers Profits on your Books



It is not the mere profit on the piston rings you install that counts but the satisfied cus-

tomers who send you new customers and gradually build up a lasting profitable business for you.

Your books will soon show bigger profits through increased business if you use No-Leak-O Piston Rings on every job. They are made in one piece--easy to install--quick seating--individually tested and guaranteed for accuracy--made of finest material, guaranteed against breakage--and because of the patented "oilSEALing" angled

groove they give proper Oil Control and Compression in *each individual ring*: When reversed in the top groove of each piston, No-Leak-O keeps kerosene and unvaporized gasoline out of the oil pit.

Over 200 reliable jobbers and dealers carry No-Leak-O Piston Rings in all standard sizes and oversizes. If yours does not, send us his name and address.

## Free Literature

Write for free booklet "The Piston Ring Problem and Its Solution." -- Also price list and special offer to the trade. Let us tell you how to "cash in" on our 1922 Saturday Evening Post advertising. **WRITE TODAY**

**Important:** In buying Piston Rings insist on the genuine No-Leak-O with the Original "oilSEALing" groove, packed in this standard package bearing the famous ring and seal, our registered trade mark

BALTIMORE

NO-LEAK-O  
PISTON RING COMPANY

MARYLAND



**NO-LEAK-O** *Piston Rings*  
WITH THE ORIGINAL OIL SEALING GROOVE



# MOTOR AGE

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## "Take One"

GOODRICH RUBBER CEMENT will sell faster now than any tire accessory you have hitherto handled.

Here's why:

In place of the dull box in which cement is commonly packed, GOODRICH RUBBER CEMENT comes in a carton which opens up into a beautiful self-supporting stand for your counter or showcase. The color scheme is so artistic and brilliant it attracts the eye of all entering your store. None can miss it—or resist it.

Stock this self-selling GOODRICH RUBBER CEMENT now.

THE B. F. GOODRICH RUBBER COMPANY  
 Akron, Ohio

# Goodrich ACCESSORIES

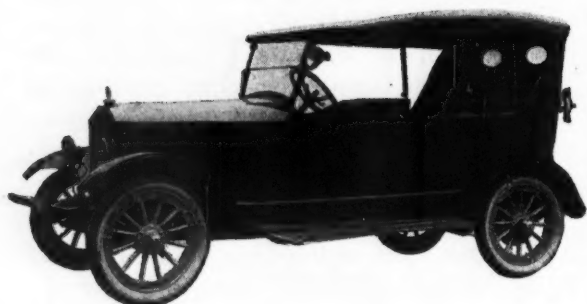
BLOWOUT PATCHES  
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 RUBBER CEMENT



**W**HAT would you give for a franchise that permitted you to buy cars as you needed them, instead of tying up your capital in a burdensome "quota?"

What would you give to sell the most carefully and expensively built light car that a popular price can buy?

Complete line from one factory: Four and six-cylinder passenger cars and four-cylinder light delivery trucks.



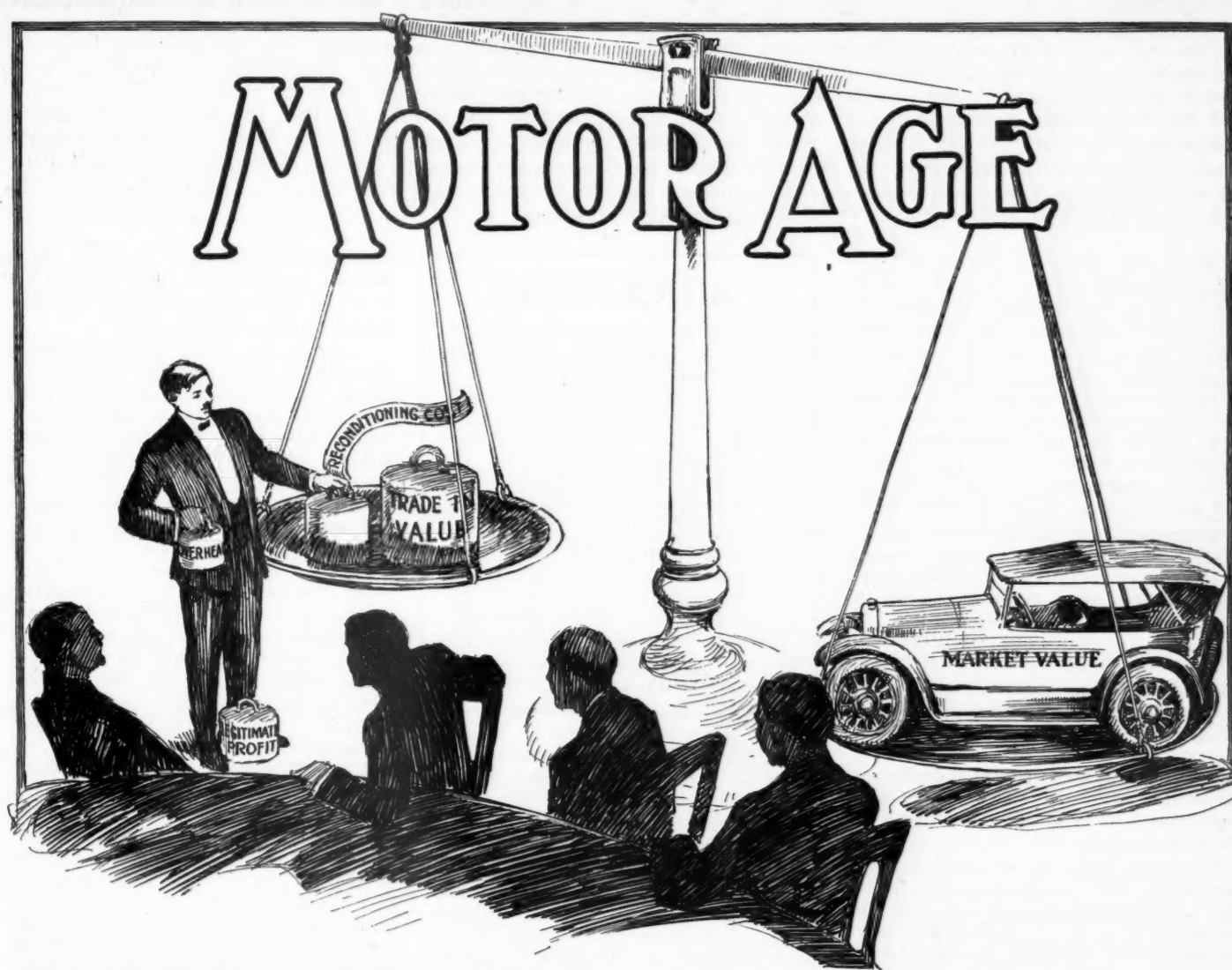
*We have the franchise!  
We have the car!  
You have the territory!*

*Write and ask about them.*



**BELL MOTOR CORP.**

**YORK, PA.**



## *The Saginaw Dealers' Plan of* **Making Money on the Used Car**

**SIX Years' Trial by the Members of the Saginaw Dealers' Assn. Has Shown It to Be Practical and Profitable—Cleaner Competition and Greater Cooperation Has Resulted in Benefits to All**

By GUY S. GARBER

*President of Michigan Automotive Trade Assn.*

**I**N the last twelve months our Saginaw Auto Dealers Association has been bombarded with requests from all parts of the country, from dealer and other trade organizations, for the explanation of what they are pleased to designate as "The Saginaw Plan." I do not maintain that our solution of the Used Car question is the only one, but I do know that it has been proved practical in our city, that it has produced the results and "by their works shall ye know them."

It seems to me that every dealer should be interested

in knowing how problems which confront him are solved elsewhere and I will try to make this digest of our Used Car solution as plain and explicit as is possible.

Our plan, as I will try to outline it, is based entirely on the faith we have in our competitor. We are blessed, here in Saginaw, with a lot of very good dealers, much better—we think—than in the average town of our size. We are completing the sixth year and our plan is working very satisfactorily. We know we could not successfully retail



cars here without the co-operation we are getting from our competitors.

Realizing the seriousness of the used car situation early in the Spring of 1916, when the dealers were giving fabulous prices and it seemed to be the desire of certain dealers to outbid their competitors—with the result that none of the dealers were making money, or at least not in the proportion that they should, a meeting of all the dealers was called early in March. After the evening's discussion it was decided that an organization should be formed, to be known as the SAGINAW AUTOMOBILE DEAL-

ERS' ASSOCIATION. Its principal purpose at that time was to formulate a plan on which we could all handle used cars.

A meeting was arranged for the following week, at which time the by-laws were to be submitted and each dealer was instructed to bring with him the allowance prices on the line he handled, the other dealers having nothing to do with the pricing of his line, on each model covering a period of five years, listing at that time 1916, 1915, 1914, 1913, 1912. The prices were submitted by the dealers.

They were compiled and each dealer was furnished with a copy in a loose-leaf vest-pocket booklet, alphabetically arranged, and since that time every dealer and salesman has carried one of these books. (A sample sheet is illustrated at right.) The prices are changed from time to time as conditions warrant, and during the past eight months the prices have been changed materially.

In the beginning we realized that one of the important things to make this a success was for the dealers to get together regularly and often. Consequently we arranged, in our by-laws, for a fine of \$10 to be assessed against any dealer who did not answer roll call. No excuse is accepted excepting illness. We think this helped wonderfully in getting a good start.

We also, at that time, found it would be necessary to get our retail forces sold on this idea of co-operation, and immediately we accepted the salesmen as associate members. When the salesmen were sold on this idea it overcame the biggest obstacle.

We now have a monthly meeting, which includes the total membership of the automotive industry in our city. Our membership at this time numbers 105.

The active members, those who are the heads of concerns having contracts for the sale of cars, have a meeting every Monday noon. This meeting is devoted to matters pertaining to the sale of cars.

#### How the Trade in Allowance Is Fixed

In regard to arriving at the price we allow for Used Cars, I will give you the following example:

On the 1920 Buick K-45, five-passenger touring car, we first take into consideration what we could sell fifty K-45s for, thoroughly rebuilt, painted and in first-class condition. Our experience led us to price this model at \$900. In other words, it was the judgment of my organization that we could sell good K jobs for \$900 each, after they were put in first-class condition. Then we figured it would cost on an average of \$180 to put a K job in first-class condition, that means rebuilt, painted, a new tire or two, and placed on the salesroom floor looking like a real piece of merchandise. Taking \$180 from \$900 leaves \$720. Then we put the price allowance on the K-45 at \$600 and add 20 per cent to our investment for profit, which is \$120, plus \$180—cost of making real merchandise

### BUICK CARS

1921	44-45 T. and R.	\$ 850
	49 7-passenger Tour.	900
	46 3-passenger Coupe	1100
	47 5-passenger Sedan	1200
	48 3-passenger Coupe	1250
	50 7-passenger Sedan	1300
1920	K-44 and 45 T. and R.	600
	K-49 7-passenger Touring	650
	K-45 Coupe	900
	K-47 Sedan	950
	K-50 7-passenger Sedan	1000
1919	H-44 and 45 T. and R.	500
	H-49 7-passenger Touring	550
	H-46 Coupe	600
	H-47 Sedan	650
	H-50 7-passenger Sedan	700
1918	E-44 and 45 T. and R.	400
	E-35	400
	E-49	400
	E-46 and 47	500
	E-50	550
1917	D-44 and 45, 34-in. wh.	300
	D-35	150

Garber Buick Company  
Dec. 27, 1921

of the car, making a total of \$900. This gives us a fixed selling price of \$900, and a fixed buying price of \$600, which is easily explained to the customer. No intelligent customer expects you to take in a used car and not make a legitimate profit. One half of our business today, in dollars and cents, is used car business. Consequently we must have a profit on used cars, as there is not volume and profit enough on new cars to carry the overhead in our Used Car Department, and we must have a profit that will warrant our investment.

One very important point is: That the public must be educated to the depreciation on cars. Instead of telling a customer, as we did in the past, that he can buy one of our cars and drive it at less depreciation than any other make of car, we are now telling him—at the time of selling—that the depreciation the first year will be approximately 40 per cent, the second year 20 per cent of what is left, the third year 25 per cent of the balance, the fourth year 20 per cent, and the fifth year 20 per cent. This is an effort to educate them that they must expect to pay the depreciation. Figure this on your own car and you will see that, in round numbers, this is a fair depreciation, providing you expect to make a profit on Used Cars.

The prices we carry in our book are the maximum allowances for cars in good condition. If the car is in bad condition deductions should be made in proportion to its condition.

Another very important point is: The condition of the car when it is sold. There is nothing, in our judgment, worse

than selling a used car "As Is." There may be exceptions to this, where a car is really in first-class salable condition, but there are very few.

It is our contention that in order to successfully cope with the used car situation for the next twenty years we must build up the same faith and confidence with the public that the manufacturer has—in building a reputation on his product. In order to do this we must put the used car in such condition that we would not be ashamed to drive it through our main streets, or be afraid to take a trip of a thousand miles in it. When the car is put in this condition and set on our salesroom floor it is good merchandise and can be sold at the right price. Patching up an old car, using cheap paint, etc., is not the way our factories build up their reputation and we believe it is just as much our duty to build confidence in used cars. In fact, we all agree that we must successfully handle used cars in order to successfully handle new cars. It resolves itself into making real merchandise of used cars, which can only be done by buying at a fair price and rebuilding and putting them in real condition. It is our idea that price does not represent a bargain on a used automobile. We do not believe we have ever done anything in our lives that has injured our business and our future as much as selling used cars "As Is." The public must be taught that we have got to buy these used cars at a fair price so we can rebuild them, and they also must be taught that we are entitled to a profit on used cars just as much as we are entitled to profit on new cars.

#### Figuring the Year's Replacement Business

Now, without the co-operation of the dealers, and with one dealer bidding against the other, it is impossible to educate the public to the real value of used cars.

As stated before, at our Monday noon luncheon are the heads of every retail establishment in our city and they are there as a board of directors, directing the destinies of the retail automobile business in our city.

There are approximately 12,000 cars registered here, and we believe that eight years is a fair average life of an automobile. This means that there is an actual replacement of cars in our city, each year, of 1,500 automobiles, and that a conservative estimate of the deal-

er's profit, per car, will average \$200. This means that the public is ready to give us \$300,000 on this year's renewal business, providing we will take it. We do not believe that the public wants cut prices. It does want fair dealing and real service.

On our Monday noon meetings depend the success or failure of our used car plan. If a deal has been made during the week that does not look right, it is put up to the dealer at this meeting. Or if he, or any of his men, during the week has used any of the old cut-throat tactics, such as knocking his competitor or the competitor's product, or any of the other numerous things that go with the old style way of merchandising, it is a very uncomfortable place for this dealer. If he has been called on the carpet once, he does not want to be called again. We have found in the past few years, very few occasions to call the dealer on the carpet. The fact is, every one of the dealers know that the success of his business depends upon this organization. Consequently they are glad to co-operate.

#### Harmony and Cooperation Among Members

At the weekly meeting it is our purpose to cultivate harmony and co-operation among the dealers. At this meeting matters of importance to the industry are taken up by the chairman, and then the chairman calls on each man for anything he has to take up. The purpose of this is, if a dealer thinks another dealer is bidding more for a used car than the book allowance, it is his duty to take up the matter at this meeting. There is no penalty whatever if a dealer pays more for a car than it is listed at, but every dealer realizes that if he pays more for a car than it is worth, it is doing an injury to our industry. If a dealer does cheat and comes to the Monday noon meeting it is a mighty embarrassing place for him. If he does not come to the meeting it is evidence that he has cheated and does not dare to come. This being the understanding, we usually have a full attendance.

If a dealer comes to the meeting, thinking that one of the other dealers is paying more for a used car and does not take up the matter, going away with the same thought he had when he came, then the meeting is a failure. But if he does take it up with the dealers, or the particular dealer he is concerned in, he will leave the meeting with the satisfaction of knowing this dealer is not paying too much for used cars. In practically every instance we find that the dealer is not paying more than the allowance price as the customer often misrepresents the statement of the dealer.

We have found a very satisfactory way to correct this. When we call on a customer and make him a proposition on his old car and he says such and such a dealer called the day before and made him such and such a price on his old

car, we do not dispute him but ask to use his telephone. We call up the dealer mentioned and ask him why he offered such and such a price, as it does not agree with our book allowance—we must have an old book or have the wrong prices in some way. In every instance we find that the dealer comes back in a very loud voice—loud enough to be heard by the customer standing near the phone, that he—the dealer—did not make any such proposition. This sometimes is embarrassing to the customer.

#### Educating the Owner on Used Car Values

Our plan has been in operation so long that the public is fairly well educated regarding the value of its used cars, and we believe that before the year is over we will have a page in our local paper once a week, paid for by the association, on which each dealer will quote his allowance prices. Then the customer can see what the price is on his car, just the same as though he were looking for the price of wheat, corn, etc. We believe this will assist in teaching the customer the actual value of his car.

The question often comes up, is it fair to give every man the same price for his automobile, regardless of the mileage and condition. We find, from experience, that there is very little actual difference between cars of a certain age. Practically every one should be rebuilt, painted and a certain amount of top and trimming work done. In taking fifty jobs our experience is that they will vary very little in the actual cost of putting them in marketable condition. Whether a car has been driven 4,000 or 20,000 miles we find no difference in the resale value. When the car is properly rebuilt the man who buys the car with the longer mileage gets just as good value as the man who buys the car with the lesser mileage.

We make a proposition to the man

who has taken exceptionally good care of his car, or who has just had it rebuilt, painted, put on new tires, and then decides he will buy a new car. We will not trade and allow him one dollar more for this car. On the other hand, the customer will not accept the allowance price. If we can find a buyer and sell his car for more than the allowance price, we accept the used car order and submit it to a committee of three to investigate. If they find the car is in exceptionally good condition and that it is sold, the committee O. K.'s the deal. After the used car is sold and delivered, then we deliver the new car to the customer on a straight sale basis. However, we find these cases are very few.

In handling used cars we think there are two big things involved. The biggest thing is the condition of the used car when we sell it. The other is buying the car at a price that will allow us 20 per cent commission on our investment.

#### Do Not Vary From Maximum Trade in Allowance

In a few words—our plan is simply this: We, the Buick dealers, list our cars at the maximum price we would give for them in good condition, meaning by "good condition" the average car as we find it in every-day trade-ins. If the tires are worn out, or the fender smashed, or the car is in otherwise damaged condition, we buy it for the least amount possible. The allowance listed in our book means that it is the most we will give for the car, regardless of its condition. Other dealers list their cars with the same understanding and we simply live up to these prices. We know, from experience, that it can be done. This merely puts us on an equal competitive basis and allows us to sell our new merchandise on its merits.

*This article was prepared for the Michigan Automotive Tradesman*

### Comparison in Factory Prices on Ford Cars from August, 1909, to January, 1922

This interesting and valuable reference table showing the price history and engine numbers of Ford cars hangs in the showroom of the Rude Motor Co., Ford dealer in Perry, Ia.

Date.	Engine No.	Tour.	Roadster	Coupe	Sedan	Chassis	Truck
August, 1909	8107	\$850	\$825	\$950	.....	.....	.....
August, 1910	30200	950	900	900	1050	.....	.....
August, 1911	62100	780	680	680	1050	.....	.....
August, 1912	139700	690	590	590	.....	.....	.....
August, 1913	298200	600	525	.....	.....	.....	.....
August, 1914	517800	490	440	750	975	.....	.....
August, 1915	881000	440	390	590	740	360	.....
August, 1916	1362213	360	345	505	640	325	.....
August, 1917	2113500	360	345	505	645	325	600
August, 1918	2765250	525	500	650	775	475	550
March, 1920	3817431	575	550	*850	*975	525	600
August, 1920	4233351	575	550	*850	*975	525	640
September, 1920	4329901	440	395	*745	*795	360	545
June, 1921	5008001	415	370	*695	*760	345	495
September, 1921	5337546	355	325	*595	*660	295	445
January, 1922	.....	348	319	*580	645	285	430

\* Includes starter and demountable rims.



# Possibilities of Shows Hampered by Poor Salesmanship

**SALESMEN Spend Too Much Time in Gossiping Among Themselves and Are Not on Toes When Mr. Prospect Enters Booth—Investigator Finds Evidence of Knocking Competitor Cars**

By S. A. MILES

Manager of the National Automobile Shows

**N**O MATTER how successful the shows may have been in the matter of financial returns, I feel that we have a responsibility in determining to what extent they have been successful in other ways and what steps are necessary to insure their permanent value.

It has probably become evident to most observers that salesmanship in the automobile industry has not reached the peak of perfection.

For 15 years or more we have enjoyed a condition which, in some respects, has an unfortunate influence on some of the salesmen of today. In many cases it has not been necessary to devote great energy or skill to the sale of cars. Some of our salesmen have grown into the habit of being approached rather than approaching. This condition was in evidence at the New York show.

The Chicago Automobile Trade Assn. made an earnest endeavor to change the conditions. The directors prepared a list of questions and answers to be placed in the hands of salesmen. The questions were submitted to, and criticized by, 57 of the principal Chicago dealers, but even after that they were not ideal. They were printed and placed in the hands of the attendants at the exhibits.

## Checking Up On the Salesmen

The association appointed one or more representatives who were unknown to the salesmen, whose business it was to circulate through the building and ask questions of the salesmen. A prize of \$50 was awarded each day to the salesman who gave the most logical answers and deported himself most satisfactorily. In order to be eligible the salesman was required to wear a badge provided by the association. A report of results was sent to each member daily.

The association has furnished me with a portfolio containing all of the documents issued by the association in connection with the show. It contains not only the questions and answers above referred to but other information which might have been useful to the salesman, including many items taken from "Facts and Figures" and other documents issued by the National Automobile Chamber of Commerce.

The most important feature, however, is the report of investigators. This report was issued on January 30, and sent to all members of the Chicago association. It embraced a detailed report of the investigators' experience and set forth the following:

"Several salesmen eliminated themselves from Saturday's contest by standing around and talking among themselves and not paying attention to 'Mr. Prospect' when he called. Don't make that mistake again.

"Several others evidently concluded that 'Mr. Prospect' was a 'boob,' 'dumbell,' 'hick,' or 'mere looker.' They didn't offer to interest him in their cars notwithstanding he looks like the ready money.

"Several other salesmen eliminated themselves by knocking other cars, calling them 'awful cans,' 'junk,' etc.

"Several other salesmen stood around and talked and giggled with some girl friends, while 'Mr. Prospect' was trying to learn something about their car.

"'Mr. Prospect' found several men who were close contenders for the prize—but they were a little 'short on the eight questions and answers.'

The report of February 1 contained this paragraph:

"On the whole the men are very attentive and courteous, although one general trouble is that they stand about and gossip with each other and neglect visitors.

"Salesmen paid no attention whatever to my presence in the booth. There were two or three unoccupied. One of them nearly fell over me in passing but did not even stop to apologize. Went back the second time but they were as independent as before.

"Stopped at this booth three times but received no attention although some of the salesmen were only occupied in discussion among themselves.

"Hung around this booth for quite some time but all the salesmen were too busy among themselves to show me any attention.

"At the time I called at this booth, there were no prospects there. Four salesmen were having a conference and paid absolutely no attention to me although I was around the booth for about ten minutes looking over the cars and waiting for one of them to approach me.

"There are some who have become so blase that they assumed the attitude of an exhibition attendant rather than a salesman.

"We find that gossip among the salesmen is on the increase and the public in some cases is not receiving the attention it has a right to expect.

## Some Disappointing Treatment

"I visited this booth upon three different occasions and received no attention whatever. I noticed only one badge in the booth and I angled in an endeavor to get this man to approach me, but he was leaning against the wall and talking to another man or two and apparently wasn't on his toes.

"I visited this booth twice but was unable to find a badge upon either occasion.

"I am quite surprised at the general demeanor of the salesmen at this exhibit. I had expected to find them a very aggressive organization, but I was keenly disappointed. I did not succeed in getting the man's name to whom I talked, but he was not worthy of consideration. Not for the reason that he was lacking in appearance or that of courtesy, but more on account of his lack of knowledge of the automobile business in general and his product in particular; was unfamiliar with questions and answers.

"Visited this booth twice and in each instance no salesman upon the floor wore a badge.

"There were no salesmen here with badges.

"This company has a spieler in its booth talking its car. Upon my call there I found the salesmen were more deeply interested in listening to this man's talk than they were in greeting the public. I made my second call at this booth and was not approached.

"On the last two days of the show the investigator found an improvement but several men made the mistake of knocking other cars. There were fewer cases of inattention on the part of the salesmen."

The winners of the prizes were as follows:

January 28—Paul W. Rader, Magnetic Motor Corp., representing the Stevens-Duryea Co.

January 30—P. D. Weeks, R. & V. Knight Co.

January 31—Russell Robinson, Irwin Greer Auto Co., representing the Stutz Motor Car Co.

February 1—Holmes K. Mercer, Allison-Rood Co., representing the Lincoln Motor Co.

February 2—J. S. Deutsch, Studebaker Sales Co.

February 3—Frank Binz, Jr., Mitchell Auto Co.

The lesson we may learn from these conditions is, I think, that the exhibits lack adequate supervision. Year by year the men at the top become more and more conspicuous at show time by their absence. This has been particularly noticeable at Chicago. On one day of the show, in an endeavor to obtain an answer to the question so frequently asked, whether any actual business was being produced, I made a personal visit to every exhibit in the Coliseum. My acquaintance in the industry is fairly extensive but I was able to find only three men of my acquaintance and only one of these was a factory representative of major importance. The same remark is true of casual visits made at other times during the week. It is also true of my visits during the New York show.

## Salesmanship at the Shows

**B**BETTER salesmanship is needed before the automobile shows can realize their maximum possibilities, according to S. A. Miles, show manager, reporting to the members of the N. A. C. C. Conditions at Chicago were somewhat better than at New York due largely to the earnest efforts of the Chicago Automobile Trade Assn. which offered daily prizes for the best salesmanship and kept up constant investigation of conditions. The report of Miles is an interesting analysis of our national exhibits.

On many occasions it is necessary for us to get into communication with the gentlemen named in the show contract as the official representative of the exhibitor. I think it perfectly safe to say that not once in four times did we find the representative in the building. That the Chicago investigators' reports are true, I know from the fact that not in a single instance during my trip through the building was I accosted by a salesman.

It is my belief that if the shows are to continue successful in all respects, a higher order of salesmanship must be developed under the eyes of the members and their higher class representatives.

## Atlanta Dealers Introduce Novel Advertising

**W**HY not adopt a good "creed" for your service station and feature it in your newspaper advertising?

The Ansley Garage Co., operators of a large station in Atlanta, Ga., are obtaining excellent advertising results by this method.

Here is the "creed" as formulated by this company:

"We believe in the stuff we are handing out, in the firm we are working for and in our ability to get results.

"We believe in working, not weeping, in boosting, not knocking, and in the pleasure of our work.

"We believe that honest stuff can be passed out to honest men by honest methods.

"We believe that a man gets what he goes after, that one deed done today is worth two done tomorrow, and that no man is down and out until he has lost faith in himself.

"We believe in courtesy, in kindness, in generosity, in good cheer, in friendship and honest competition.

"We believe there is something doing somewhere for every man ready to do it. We believe we are ready — RIGHT NOW."

### Another Way of Preparing "Copy"

**T**HE Motor Tire Co., of Atlanta, Kelly Springfield tire dealers, and operators of the largest tire repair shop in the South, obtained some good advertising results recently with a series of ads calling attention to their tire service rendered for special classes or profes-

sions, such as doctors, bankers, etc. The idea is best conveyed to your mind by briefly describing an ad of this nature recently used. The ad in question was headed, "ASK YOUR DOCTOR," the body of same running as follows:

"Your doctor knows something besides pills and tonics. He probably knows Motor Tire Service—for a great majority of Atlanta doctors use our service exclusively. These doctors know that time with them may mean life or death, and they have learned that our service is not only prompt, but dependable and efficient. We repeat—"Ask Your Doctor."

An advertisement along the same lines was used with the banker, etc.

### "Tying in" News With Advertising

**A** GOOD illustration of where a dealer "tied in" the news of the day with his advertising, recently appeared in an ad of the Georgia Auto Supply Co., of Savannah, Ga. Taking advantage of daily events in this way sometimes affords the dealer a good opportunity for worthwhile publicity. The case in question was that of Larry Dimmitt, head of this Savannah company, who had advertised a big used car sale. But on the day of the sale it rained heavily and he postponed it. That evening, however, he took advantage of the rain by inserting the following ad in the Savannah evening papers:

I AM WORTH \$1,000,000 A YEAR TO THE FARMERS OF GEORGIA

I can bring rain any time by putting on a used car sale.

Soon as it stops raining I am going to put on absolutely the biggest used car sale ever held in Savannah.

Watch for our big advertisement as soon as the sun comes out.

Larry Dimmitt.

### THE GIANT PNEUMATIC

**S**INCE the giant pneumatic tires have been advocated for use on busses there has been a great deal of speculation as to what would happen if there was a blowout on one of these. It has been contended by many that this would cause the vehicle to upset and that it might be injurious to anyone standing near when the blowout occurred. This discussion became especially acute in England where these giant pneumatics are used very freely on busses. So, to decide the question E. R. Preston, managing director of the Goodyear Tire & Rubber Co. of England staged a special blowout. This was accomplished by setting a knife edged spike beneath the surface of the roadway so that it could be raised in time to cut the rear tire of a bus.

The result was a blowout and the tire was complete flat within 15 feet but there was no damage except to the tire. The men in the vehicle felt only a slight jolt and the man who manipulated the spike stood close by the roadside and was not seriously affected by the result. There was no lurching of the vehicle and the corner of the bus over the deflated tire settled only one and one-quarter in.



# System and Records Necessary in Operating Under Fixed Price System

## *HOW the Cruse-Crawford Co. Has Applied Good Management to Its Business of Servicing Automotive Vehicles Under the Flat Rate Method*

ONE of the best arguments we have as to the practicability of the flat rate or fixed price system of selling automotive repair work is to point out occasionally the success which those concerns are having with it who apply it correctly and follow it up thoroughly. It calls for system and records, yes, but what business is there that can be intelligently and successfully handled without system and records?

It is just as necessary to keep a time record on a repair operation under the flat rate system as with any other system, even though a fixed price has been established for the job. This is so because in time new methods of operation may be adopted, new equipment added, the engine or car may be altered in design and construction a little so the method of procedure may be affected and there may be other factors to enter. Therefore, the time record is important because ultimately it may mean a new "bogey" for the job.

The flat-rate system has been in use now for some time at the Cruse-Crawford Manufacturing Co., Birmingham, Ala., operating one of the largest service stations in this territory and the system has proven very successful.

When a car is brought in for repairs it must, of course, be given a very careful and thorough inspection by one who is entirely conversant with its mechanical construction, one in fact who is capable of accurately diagnosing its ailments and who can estimate with more or less precision just what it is going to cost the company to make those repairs. Otherwise where the flat rate system of service operation is practiced losses are very likely to result due either to inaccuracy in making the estimate, or to overlooking certain repairs that it may be later ascertained are requisite.

This, of course, is more important where the customer wants such repairs as the car may really need, regardless of what they may be. It is the less important as can be readily seen if the customer happens to want only

Fig. 1—This is the initial repair tag which is filled out by the inspector

certain repairs which he himself may specify, and does not wish to go to the expense of any other repairs that the inspection of the car may show are necessary.

### *The Repair Ticket*

Figure No. 1 is known as the repair tag and is the initial form filled out by the inspector. The first step in the operation is to carefully examine the car and its mechanism. When this is done the inspector knows precisely what repairs the car may need. However, there are three kinds of customers to deal with and here the element of service salesmanship enters into the transaction.

(1) The average customer is a layman and as a rule unfamiliar with the technical details of the car. He may know that the car has need of certain repairs and he will specify that these repairs be made. With some customers no amount of argument will avail and they will authorize only such repairs as they had in mind when entering the station.

(2) Then there is the customer who is open to argument, and who can be prevailed upon to have all, or at least part, of the repair work done that the car really needs, even though that cus-

Fig. 2—Here is shown the card which is attached to the car as it goes through the shop

tomers, too, may have had only certain repairs in mind when he entered the station. An inspector who not only understands the mechanical side of the business, but who is also more or less conversant with the principles of salesmanship, has a pleasing personality and a convincing way about him, can obtain a considerable volume of additional business for a service station.

(3) The third customer is he who will take the inspector's word for it and authorize such repairs as are recommended. Truly this is a valuable sort of customer to have.

### *Customer Signs Order*

It will be noted from an examination of Figure 1 that the repair tag is somewhat more detailed and complete than such a form as used by a majority of service stations. It has resulted, however, from several years of experience in service work, a fact which should be borne in mind relative to the entire system as herein described.

Inspection of the form, too, will show the precise information that should be listed without the necessity of discussing the matter here. One interesting and valuable feature it will be noted is the space provided for the customer's phone number. Good will is built by phoning the customer promptly when the job is ready, which is also centered on this form.

Another interesting feature is the fact that the customer is asked to sign this form twice, first authorizing the repairs over his own signature, and second signing at the bottom when the car has been duly delivered. While no form is provided on the opposite side of this card for that purpose, to guard against error the time required on the job and all parts used are written on the back of it. This provides a double record as there are requisitions also for this purpose.

Figure No. 2 represents the card that is attached to the car while it is going through the shops. This number, of course, should correspond with that of the repair order on the form illustrated by Figure 1. When the job is finished and the car ready for delivery the bottom is torn off. The top is left with the car and the bottom part then sent to the general offices where it is filed with the other forms used on this par-

ticular job. As the printed number—435, on this particular for—always corresponds the car can be located in a very few moments' time no matter if the shops be overloaded with work.

### Record of Various Departments

Now as regards the company's records on each separate job that is brought into the station, these records doubtless are far more thorough and complete than the average service station will desire to use, or even will need. This is due to the fact that the Cruse-Crawford company operates a number of separate departments, 10 in all. These include such as a paint department, a complete body building department, blacksmith shops, etc. However, in examining the various forms and records used as reproduced in connection with this article the service station manager can easily eliminate such entries as may not be requisite to his particular station.

Figure 3 illustrates what is referred to as a sub-repair order and includes thereon the record of the work done on each particular job in the painting, trimming, woodwork or blacksmith departments. With such a record as this the company is able to accurately determine the labor costs in each one of these separate departments on any particular repair job which may go through the plant, and with such figures available it is possible to obtain for any single month more or less complete information on operating costs, either for the plant as a whole, or for some on department as the case may be. For upon this form also are listed the separate operations in addition to the cost of the labor.

The opposite side of this sub-repair order is illustrated by Figure 4 and here are listed all material costs, and a recapitulation of the total cost of the work. One of the most interesting features of this form is the provision for overhead costs included in the total cost summary.

### Knowledge of Costs

So accurate is the system as a whole and the general operation of the plant that the company knows almost to a penny what the average overhead costs are in each separate department. In this way the overhead costs of any single job can be estimated closely and being included in the labor and material costs the total obtained represents just what the whole job cost the company. Therefore if the job was on the flat rate basis, which is practiced at this station whenever it is possible to do so, the recapitulation will show almost to a penny just what profit the company made on the job.

The system is so thorough and so accurately worked out that it is very seldom the flat rate charge does not show the company its just profit over and above the total costs of the work performed.

Figure 5 illustrates what is referred to as the repair order, and this is used in connection with the sub-repair order

SUB-REPAIR ORDER										No. B					
CUSTOMER'S NAME								ORDER NO.		INVOICE NO.					
ADDRESS								CITY		STATE					
RECEIVED								PHONE NO.		DELIVERY INSTRUCTIONS					
EST'D DELIVERY								COMPLETED		DELIVERED					
LICENSE NO.								MODEL		SERIES					
MOTOR NO.								DATE ORIGINAL DELIVERY		MILEAGE					
OPERATION										BE SPECIFIC		OPERATION			
1										2		3			
2										3		4			
3										4		5			
4										5		6			
5										6		7			
6										7		8			
7										8		9			
8										9		10			
9										10		11			
10										11		12			
PAINTING										TRIMMING		WOODWORK		BLACKSMITH	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	

Fig. 3—The sub repair order. This includes a record of work done in each department, painting, trimming, blacksmithing, etc.

DEPARTMENTS										PARTS		TIRES		TRUCKS		STEPHENS CARS		NATIONAL CARS		USED CARS AND TRUCKS									
Inter-Dept. Orders Issued																													
Outside Orders																													
Distribution																													
QTY.										MATERIALS		AMOUNT		QTY.		BILLING		AMOUNT											
LABOR COST SUMMARY										MATERIAL COST SUMMARY										TOTAL COST SUMMARY									
WOODWORK										LUMBER										TOTAL LABOR COST									
PAINTING										PAINT										TOTAL MATERIAL COST									
TRIMMING										TRIMMING MATERIAL										OVERHEAD									
BLACKSMITH										BOLTS, ETC.										TOTAL COST									
BLACKSMITH HELPERS										MATERIAL BOUNTY																			
FLOATING LABOR										MISCELLANEOUS																			
TOTAL LABOR COST										TOTAL MATERIAL COST																			

Fig. 4—Opposite side of sub repair order which lists all the materials used and is a summary of labor, overhead, etc.

REPAIR ORDER										No. C 4131									
CUSTOMER'S NAME								ORDER NO.		INVOICE NO.									
ADDRESS								CITY		STATE									
RECEIVED								PHONE NO.		DELIVERY INSTRUCTIONS									
EST'D DELIVERY								COMPLETED		DELIVERED									
LICENSE NO.								MODEL		SERIES									
MOTOR NO.								DATE ORIGINAL DELIVERY		MILEAGE									
OPERATION										BE SPECIFIC		OPERATION							
1										2		3							
2										3		4							
3										4		5							
4										5		6							
5										6		7							
6										7		8							
7										8		9							
8										9		10							
9										10		11							
10										11		12							
ITEM 1										ITEM 2		ITEM 3		ITEM 4		ITEM 5		ITEM 6	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 7										ITEM 8		ITEM 9		ITEM 10		ITEM 11		ITEM 12	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 13										ITEM 14		ITEM 15		ITEM 16		ITEM 17		ITEM 18	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 19										ITEM 20		ITEM 21		ITEM 22		ITEM 23		ITEM 24	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 25										ITEM 26		ITEM 27		ITEM 28		ITEM 29		ITEM 30	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 31										ITEM 32		ITEM 33		ITEM 34		ITEM 35		ITEM 36	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 37										ITEM 38		ITEM 39		ITEM 40		ITEM 41		ITEM 42	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 43										ITEM 44		ITEM 45		ITEM 46		ITEM 47		ITEM 48	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 49										ITEM 50		ITEM 51		ITEM 52		ITEM 53		ITEM 54	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 55										ITEM 56		ITEM 57		ITEM 58		ITEM 59		ITEM 60	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 61										ITEM 62		ITEM 63		ITEM 64		ITEM 65		ITEM 66	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 67										ITEM 68		ITEM 69		ITEM 70		ITEM 71		ITEM 72	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 73										ITEM 74		ITEM 75		ITEM 76		ITEM 77		ITEM 78	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 79										ITEM 80		ITEM 81		ITEM 82		ITEM 83		ITEM 84	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 85										ITEM 86		ITEM 87		ITEM 88		ITEM 89		ITEM 90	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 91										ITEM 92		ITEM 93		ITEM 94		ITEM 95		ITEM 96	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 97										ITEM 98		ITEM 99		ITEM 100		ITEM 101		ITEM 102	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 103										ITEM 104		ITEM 105		ITEM 106		ITEM 107		ITEM 108	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 109										ITEM 110		ITEM 111		ITEM 112		ITEM 113		ITEM 114	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 115										ITEM 116		ITEM 117		ITEM 118		ITEM 119		ITEM 120	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 121										ITEM 122		ITEM 123		ITEM 124		ITEM 125		ITEM 126	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 127										ITEM 128		ITEM 129		ITEM 130		ITEM 131		ITEM 132	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 133										ITEM 134		ITEM 135		ITEM 136		ITEM 137		ITEM 138	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 139										ITEM 140		ITEM 141		ITEM 142		ITEM 143		ITEM 144	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 145										ITEM 146		ITEM 147		ITEM 148		ITEM 149		ITEM 150	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 151										ITEM 152		ITEM 153		ITEM 154		ITEM 155		ITEM 156	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 157										ITEM 158		ITEM 159		ITEM 160		ITEM 161		ITEM 162	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 163										ITEM 164		ITEM 165		ITEM 166		ITEM 167		ITEM 168	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 169										ITEM 170		ITEM 171		ITEM 172		ITEM 173		ITEM 174	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 175										ITEM 176		ITEM 177		ITEM 178		ITEM 179		ITEM 180	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 181										ITEM 182		ITEM 183		ITEM 184		ITEM 185		ITEM 186	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 187										ITEM 188		ITEM 189		ITEM 190		ITEM 191		ITEM 192	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 193										ITEM 194		ITEM 195		ITEM 196		ITEM 197		ITEM 198	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 199										ITEM 200		ITEM 201		ITEM 202		ITEM 203		ITEM 204	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 205										ITEM 206		ITEM 207		ITEM 208		ITEM 209		ITEM 210	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 211										ITEM 212		ITEM 213		ITEM 214		ITEM 215		ITEM 216	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 217										ITEM 218		ITEM 219		ITEM 220		ITEM 221		ITEM 222	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 223										ITEM 224		ITEM 225		ITEM 226		ITEM 227		ITEM 228	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 229										ITEM 230		ITEM 231		ITEM 232		ITEM 233		ITEM 234	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 235										ITEM 236		ITEM 237		ITEM 238		ITEM 239		ITEM 240	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 241										ITEM 242		ITEM 243		ITEM 244		ITEM 245		ITEM 246	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 247										ITEM 248		ITEM 249		ITEM 250		ITEM 251		ITEM 252	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 253										ITEM 254		ITEM 255		ITEM 256		ITEM 257		ITEM 258	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 259										ITEM 260		ITEM 261		ITEM 262		ITEM 263		ITEM 264	
EMP. HRS. L. COST										EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST		EMP. HRS. L. COST	
ITEM 265										ITEM 266									





# "Cashing In" On What You Can Best Do

*How a Dealer Capitalizes His Knowledge of Automobile Design and Maintenance to Make Sales*



A. L. BELLE ISLE

"IT doesn't make a particle of difference what a man is selling, he should know more about that article than the man he is trying to sell it to. Especially is this true in the selling of automobiles. In the automotive industry the real salesman of today is the one who has a thorough mechanical knowledge of the motor car or truck he is selling; he should be familiar with the technical construction of that car from radiator to rear axle. Such knowledge is just as important to the salesman, in my opinion, as it is to the foreman of the service shops, or to the mechanic who does the work on the car or truck in the service station."

-:- -:- -:-

This is the manner in which Alvin Looney Belle Isle, of Atlanta, Ga., expressed his views of the modern automobile salesman. And, inasmuch as he has practiced exactly as he preaches for a number of years with a most remarkable degree of success, it can be taken for granted that Belle Isle ought to know what he is talking about.

When people think of the Ford car in Atlanta, they think of Belle Isle. Last year—1921—his Atlanta agency sold

more Fords than any other Ford agency in the southeastern territory. Sales were between 900 and 1000 cars, of which 600 or more represented new cars. And Belle Isle himself sold about 25 per cent more of these cars than any individual member of his sales force.

"I am a mechanic as well as a salesman," he said. "And that is the reason I often make a sale where the other fellow fails to do so."

Belle Isle first entered the automobile business as a mechanic with the White Motor Co., later working in the service station of the Goldsmith Co. in Atlanta. One day a large passenger car was brought into the station for repairs. It had been in a wreck and was in a very bad condition.

## Starts as Cab Driver

Having saved a bit of money, Belle Isle offered to buy the car as it stood, and the owner accepted. Whereupon Belle Isle took a chance, quit his job, overhauled and repaired the car himself and started in the taxicab business in Atlanta.

At that time he operated only this cab and drove it himself. Today he operates a string of cabs and employs a flock of drivers, in addition to owning one of the largest Ford agencies in the south.

And one of the primary reasons Belle Isle's Ford agency has been successful is due to the fact that he, being an expert mechanic as well as a salesman and knowing the big advantage this combination affords, has endeavored to employ men on his salesforce who could also be classed as "mechanical salesmen."

Averaging sales of more than three cars for every working day during 1921—a period when the industry was in the throes of business depression—evidences beyond doubt the stability of Belle Isle's idea.

To illustrate a case where a technical knowledge of the car resulted in a sale that otherwise would have been undoubtedly lost, Belle Isle tells of an incident during the period he was selling the Graham truck. This particular sale represented the first Graham truck sold in Atlanta, the purchaser being the Fulton Bag & Cotton Mills.

This company had let it be known that it was in the market for a truck, and several companies were endeavoring to make the sale. Naturally, the closing of the deal was a matter of considerable difficulty and something more than real salesmanship was required.

The company had decided upon a

series of tests and stated that the truck which performed most capably during these tests would be purchased. The tests were to include speed, hauling capacity, consumption of oil and gas, test in overloading, etc., etc.

Now, it is well known that a driver who has a thorough mechanical knowledge of a machine can make it perform much better than one who does not possess that technical knowledge. Expert familiarity with the motor and construction of the vehicle gives to the driver a tremendous advantage when he happens to be in competition with others who may not be mechanical experts like himself.

In the competition Belle Isle, driving his entry, made the Graham perform some remarkable work, and in every one of the tests he stood at the top. He accomplished this for the one and only reason that he was a mechanical expert, that he knew the technical construction of the truck from front to rear and top to bottom. His competitor drivers were just average salesmen who did not possess this expert knowledge.

When the tests had been completed, the Fulton Bag & Cotton Mills purchased the Graham truck, and later they purchased other Grahams from Belle Isle, so his mechanical knowledge really meant several sales.

This is only a single instance of a hundred sales of similar nature that Belle Isle tells, but it is ample to evidence the real value of mechanical knowledge in modern automobile salesmanship.

## Ford Makes Improvements in Equipment

A NEW type headlamp lens, known as the Ford H, is now being fitted as standard equipment on all Ford cars and is being supplied to branches and dealers for service and replacement. The lens has vertical flutings and is used in connection with a 21 candle-power gas filled bulb with clear glass. The lens is said to meet the requirements of all state laws. Other improvements that have been recently made are the improved wiring system, which meets the requirements of the Fire Insurance Underwriters; the pressed steel muffler, which replaces the muffler with cast ends and brackets; the redesigned pistons and connecting rods, which have been made lighter; the one-piece running board brackets; the improved fan assembly; the new design starting switch, and the dash weather trough to keep water from the coils.



## *How an Automobile Show Was Presented as a*

# Civic Institution and a Social Event Which the Public Couldn't Afford to Miss

*INSTEAD of Letting It Be Considered Merely As An Assembly of Cars, Portland Dealers Decided to Glorify Their Show as a Field Day of Motor Transportation Which Would Mark an Epoch in the City's Annals—Read How It Was Done*

PORTLAND, Ore., has just held its most successful of 13 annual automobile shows. Better attended than ever before with a nice fat pile of orders with checks attached in the hands of half the dealers who took part. Any dealer will tell you that the 1922 show exceeded expectations.

This year's annual focus of motoring interest was a brand new deal, for Portland, and for the first time the big event was made an important civic institution. The public accepted the show not as an automobile market, a showing of a lot of different cars, but as the field-day of motor-transportation, a civic and social occurrence of wide general interest.

As in other towns, the 1922 show was debated pro and con with considerable interest. Portland decided to have a show.

Having undertaken the task of staging again the annual \$30,000 exhibit, the directors held many serious minded meetings and arrived at an early conclusion that this show would have to be presented to the public in a different light if it was to make its mark and be counted in the list of the successful ones.

It was argued that success lay in the advertising campaign, or rather the public's reception of the show through publicity as something more than a motor market.

### *A New Idea in Show Decorations*

First of all came the selection of a setting for this display. At the very outset the plans of commercial decorators who handle county fairs and conventions of the fraternal orders and street carnivals were thrown into the discard. The work was given to a group of artists who had instructions to produce something different. They did. The papers called it a "pagan symphony of light and color." Visitors from east and west were frank to state that the public had never seen an automobile show like it. It was as far removed from the conventional as the Solomon Isles, and much more like them. Around the walls of the great auditorium danced a hundred nymphs in glens of rather startling trees. Every corner of the three story block square building was embellished in the same manner of the Academy of Fine Arts of Boston.

It took with the public. The morning after the opening it was the talk of the town and the gate began clicking faster. It was the touch of the original that immediately stamped the 1922 show as something not the "same old thing."

But before the opening, advertising plans of the show also underwent a change and all copy and publicity began hitting the show and not the cars.

With greatly diminished ranks of dealers, the directors were

confronted with the probability of having the annual show editions of the Portland papers tell the public that the automobile business had indeed undergone a change, the very smallness of the sections indicating that the business wasn't what it used to be. Its effect on the show was without a doubt a point to be considered.

From this developed the campaign to sell the "show" to the public as an event and not a motor market, that without doubt got the thing over.

A space budget for the local papers was first considered. This was designed of sufficient size to carry dominating position in the four Portland dailies through the ten days preceding the show. All copy was at least five columns by 16 inches and all text and illustration sold not the cars at the show but the show. All newspaper publicity was built around the same idea. It drew the gate and subsequent happenings show that it got and stimulated the buyers.

### *Every Form of Advertising Used*

But the newspaper advertising was only part of the publicity campaign. Summarized, the general publicity prepared by Ralph J. Staehli, secretary of the Automobile Dealers' Association and manager of the show, covered the following fields:

Newspaper Advertising.

Newspaper Publicity.

Posters and Window Cards.

Direct Mail Advertising with the Trade of the State.

Windshield and Hand Literature (dealer's helps).

Trade Broadside.

Local Trade Magazine Special Editions.

Speakers and Special Features, including:

Speakers at All Weekly Meetings of Civic Clubs.

Coaching all the Field Men of the Accessory and Equipment Distributors.

Letters and Literature Distributed by All Accessory and Automobile Dealers.

An Old Timers' Parade, Offering Cash Prizes to the Best or Worst Entries.

A Style Show.

A Music Night.

A State Dealer Convention.

School Children's Day.

Wherever possible, individual local advertisers were induced to use Automobile Show miniature cuts in their copy. For this generous supplies of mats were supplied to all general advertisers. Every day of the pre-show campaign a mimeographed story was sent to every paper in the state. Naturally not all of them lit, but a big portion of them did, more than paying the expense.

The advertising in the newspapers began ten days before the show. It was copy that carried out the idea of the show and

the press agents will admit that "movie methods" governed the structure of much of the stuff. It was copy designed to get the people and not to sell automobiles. It was well illustrated, the pictures bearing out the story of the artistic setting for the show that the publicity was beginning to carry.

The publicity in the meantime was running through every channel of the paper and was handled by no less than six people. The girl who wrote the art topics on the leading paper was handling that phase of the work and all the columns open to her carried the story of the work. It undoubtedly reached a class that would not have been caught on the regular show stories. Another, writing society notes, got the woman's angle of the show and there appeared story after story of visitors coming to town for the automobile show, of entertaining being done on the score of show visitors. Many of the names were those of the men of the trade and their wives but it gave the show new standing.

The commercial editor was on the trail because of the trade convention idea that had been built into the show and the automobile editors wrote the show stories as in the past.

The many beautiful posters from the national printing houses were rejected and locally created color work that seemed more appropriate to the character of the event soon made its appearance. Thousands of posters and cards appeared in every hotel, store and shop.

### Getting Free Window Display

The free space was further "worked" through the co-operation of the commercial firms of window decorators. These were called in to a luncheon and their co-operation asked for. It was gladly given and the next week every window controlled by these commercial decorators, whether clothes or hardware or any of the trade of the downtown streets, blossomed out as an ad for the show, usually built around the posters and cards furnished by the association. One even went so far as to work into each window one of the impressionistic figures produced by the show decorators. It impressed the public more than ever with the idea that the show was a civic occurrence that one couldn't miss.

The direct advertising was used mostly on the trade, though many of the dealers wrote hundreds of letters direct to their clients and prospects inviting them to the show. The accessory and equipment houses got busy with the outside trade and more than 8000 letters were sent to approximately 1000 dealers and members of the trade. The result was a registered attendance of more than 600 dealers from points as far east as Montana.

The "dealer help" form of advertising consisted of wind-

shield cards, envelope stuffer and handbills emphasizing the special rates granted for the show.

The trade broadsides and mailing pieces featured the show and the trade convention. One had a mailing card attached and proved its worth by the response.

Through the co-operation of local trade magazines and motorist publications, special covers and copy featuring the show were procured.

The speakers' campaign on the show covered every meeting of any importance in the week preceding the show. The best posted men in the trade were put in charge of this campaign, supplied with figures on the size of the business, the commercial value of motor cars and trucks, the importance of motor transportation to Oregon and Washington with their limited railroad mileage and such material, leading up to the coming show.

The accessory jobbers took their salesmen into conference before their departure for the territory and told them to talk show as much as their line. It was on the theory that some real stimulant was needed and if the show idea could only be made big enough it might jar something loose, it might put the skids under the lethargy that resulted from the first withdrawal of ready cash and continued for reasons that were not held sufficient. This and the mail campaign had their effect. More than double the number that registered at any previous show came in from the outside for Portland's 1922 event.

To help Portland get the "big week" idea of the show, the special features were prominently played. A well advertised style show made up of entries from 12 specialty shops drew the biggest night crowd ever seen at a Northwest exhibit. Conducted on a promenade high above the cars, thousands saw it and lingered to talk car. Some local dealers still maintain that such features detract from the main purpose of a show but the majority feel that for the first time the public has got over the old kick about "paying fifty cents to go see a lot of automobiles they want to sell you."

Music night appealed to a different crowd and sales made of the higher priced cars indicated that it brought out buyers. On this evening, a 40-piece concert orchestra was hired at a price that cost half the night's gate. It had played throughout the United States in the best houses and as an advertiseable feature, immediately established the show on the highest plane with the lovers of good music.

All in all it was a big week. It got public attention and stimulated the trade and it is a foregone conclusion that Portland's next automobile show will be still more of a civic event and less of an automobile market, because dollars in the pockets of most of those who took part, shows that the civic event was after all the best market.

—A Show of  
Music  
Light  
Color  
Life

**Marking a New Point in Motor Car History**

The 1922 Portland Automobile Show is a tribute to America's most indispensable instrument in our social and economic life—the Motor Car. The first industry to recover from the blow of the "return to normalcy"—the first to stride out to entirely new goals, is that of Motor Car manufacture. What these new goals mean to you will be disclosed in all the varied styles, in a rich, resplendent setting that will help you to get the best impression of your favorite.

**MUSIC EVERY NIGHT**  
**SPECIAL FEATURES**  
**EDUCATIONAL EXHIBITS**  
**THREE FLOORS OF MOTOR LORE**  
**EQUIPMENT SHOW IN CONNECTION**

### A New Appeal in Show Advertising

THESE reproductions are typical of the advertising planned by Portland dealers to give their show a new and broader appeal. The exhibit was featured as a field day of motor transportation and a social event, one that the public would profit by intellectually and economically. That the idea went over big was evidenced by the record breaking attendance.

**Motordom's Most Imposing Spectacle**  
**Showing 1922's Finest of American Cars**

THE 1922 AUTOMOBILE SHOW NEXT WEEK AT THE AUDITORIUM IS MORE THAN A MOTOR SHOW. It is a magnet of progress depicting the Wonder of the Age—the development of the Automobile. Coupled with this is the fact that:

**QUALITY FOR QUALITY.** Dollar for Dollar, Cars are Cheaper than at any time in the history of Highway Transportation.

Your best opportunity—in fact your only one of the year—to compare them all in one comprehensive assembly that includes the finest of American cars of standard make in every price field, is the 1922 PORTLAND AUTO SHOW.

**A Week of Special Events**  
MONDAY—Children's day. Admission 10c until 5 P. M. for all school children under 12.  
TUESDAY—Old-Timers' Parade—Noon.  
WEDNESDAY—Oregon State day.  
THURSDAY NIGHT—Swing night.  
FRIDAY—Music day. Orchestral programmes. Afternoon and night.  
SATURDAY—Special features.  
STUDENT BAND EVERY DAY AND NIGHT

**Auditorium—Every Day and Night—Open 9:30 A. M.**



# Functions of the Dealer in Car Distribution

***THE Dealer's Place in the Local Merchandising System Requires that Factory Supervision Be Held to the Minimum — Strong Dealers Can Be Developed Through Individual Responsibility***

By HARRY TIPPER

**T**HE whole distribution system in the marketing of passenger cars hinges upon the retailer. The position of the retailer, his business acumen, his strength, his ability to conduct properly the various departments required in the automotive business and the service he renders, are things upon which the market of the individual manufacturer depends. They are also the limiting point of the total market for automobiles to a very large degree.

The retail distribution of cars has grown with great rapidity and the retailers have come into this business from all kinds of occupations and in all kinds of ways. Most of them have not been in the business five years. They are still adventurers in what is a new line of endeavor for them. They have been able to erect a large volume of business upon a small capital during the era of rising prices and easy markets. Some of them have developed into strong, capable business men handling the largest concerns in their communities. All of them are important in the business life of their various communities and the influence which they exercise in various ways upon the community reacts upon the automotive business from that community.

## *From Many Walks to Dealership*

At the risk of being wearisome, it is necessary to repeat the statements about the short life of the average dealer in the passenger car field today and the diversity of other occupations from the ranks of which these automotive dealers have been drawn. Without this picture, the manufacturer has no ground work upon which to draw the possibilities of future development. In one small town seven car dealers represented these original occupations: One had been a successful plumber, one had been in the real estate business, two had been automobile mechanics, one had been a salesman for cars, one had been set up in the automobile business by his father because he had always been tinkering with cars, and one had been a chauffeur.

This picture can be repeated, not in the actual occupations, but in the diversity in almost any fair sized town in the United States. Implement dealers, old bicycle repair shops, salesmen, automobile owners of various kinds, and a host of others who have entered the business of retailing in this field have expanded, in many cases, with great rapidity, so that they have been obliged to meet unknown problems day after day and with but very slight experience.

Under these conditions, there must exist a wide difference in efficiency, a very great difference in the knowledge possessed and the initiative exercised by these various retailers. These, however, are established concerns. As they drop out, new concerns come in from other lines to take their places, although each year a larger number of those entering the business do so with a previous experience in the same field. The automotive manufacturer must work with these established retailers and his business depends upon their efficiency very largely.

We have stated before that the sale of passenger cars pos-

sesed many differences from the sale of other products. The passenger car is useful entirely for the service which it renders in its daily transportation of people. The efficiency of that service depends very greatly upon the character, the judgment, and the skill of the local retailer. The reputation of the car is involved in that service, in that locality, at all times. At no time can the reputation of the car be divorced from this local condition. Every man who knows the business has scores of illustrations indicating the strength of this reaction upon the reputation of the car from the character of the local service rendered in connection with its use.

## *Locations Convenient to Car Owner*

Regardless of the position held by the individual manufacturer concerning the advantage of distributors for his particular purposes, the only possible method of securing a market for passenger cars requires an efficient and stable line of retail establishments located at convenient points all over the country, so that the user of the vehicles can do his buying and secure his service in his ordinary zone of activity.

The functions of the retailer are:

First—To sell cars within his local area; to obligate himself for a definite number of cars in advance of his sales; and to undertake their distribution in the local zone of his activity.

Second—To keep in stock such items as may be required for the ordinary service of the user of the car and to provide sufficient storage space for cars while they are being served in this manner.

Third—To establish the equipment sufficiently to conduct the ordinary necessities of service and repair expected by the user, and to establish these on a reasonably rapid and fair basis.

Fourth—To maintain the departments of his business so that all the commodities required with the car and for the car can be readily secured by the customer within the reasonable necessities of the locality.

In the course of this rapid growth in the automotive field, the functions involved in retailing and servicing automobiles have not yet arranged themselves in what would be a logical or orderly percentage of development. Because of the lack of efficiency in service in many localities, exclusive repair shops have grown up. There are many exclusive storage places in the larger cities, and there are still car sales establishments unable to give the proper service to the user of the car. Supplies have not been thoroughly considered, and in general, the present situation presents many weaknesses and much confusion. This, however, is only the natural result of the growth and the entry of a large number of people into the business of retailing from so wide a diversity of previous occupational background.

In comparison with other lines of retailing covering the small cities and towns of this country, the retailing of passenger cars, the necessary service and repairs, the proper stocking of supplies, etc., represents a large business and a business involving problems foreign to other lines of retailing;

more severe and requiring a more effective experience to efficiently work them out. In other words, the efficient distribution of passenger cars requires a higher type of retailing merchant than the ordinary work of retailing goods over this country. To arrive at a decent efficiency, therefore, a longer experience is necessary and much more work must be done in the development of this branch of the field.

In the retailing, as in the wholesaling of a product, the efficiency of the business depends very greatly upon the judgment, initiative, and capacity of the individual concern. Methods of stocking, advertising aids, sales manuals, etc., are of little value unless they are backed by the use of considerable judgment and initiative on the part of the individual retailer. There is, in fact, a degree of danger in the control of the retailing system by the manufacturer too closely in detail, because this produces a tendency on the part of the retailer to lean more and more on the centralized system of the manufacturer until his individual efficiency has finally decreased very materially.

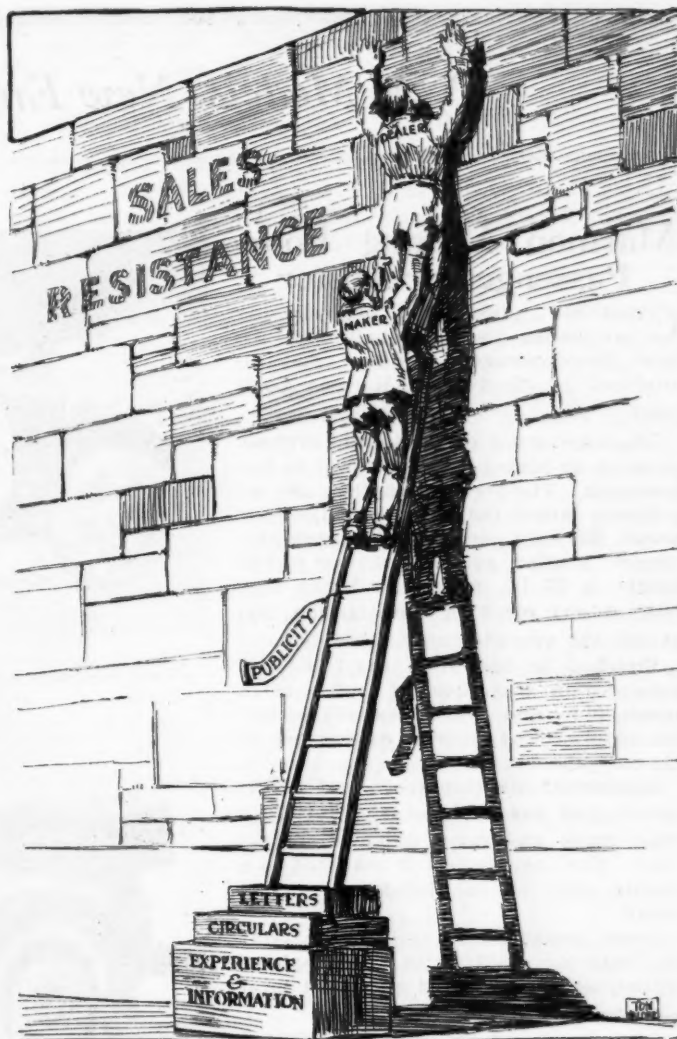
### *Efficiency in Retail Establishments*

The wide variation in the standards, in the equipment, and in the efficiency of retail establishments selling passenger cars is a difficulty of very great proportions and a difficulty which cannot be overcome merely by a closer supervision of the retailer from the factor. There should be a very much closer co-operation between the retailer and the factory, more open discussion, and more effective understanding of the problems common to both. The supervision itself should be kept at a minimum at all times because the industry needs stronger dealers, larger numbers of stronger dealers, widely distributed throughout the United States, in order that the future problems may be worked out. Strong men are not created by close supervision. They are developed by larger understanding and the necessity for proper decision upon the larger points at issue. The distribution work, particularly in retailing of passenger cars, is not yet a system. There has been no time to create a system in the few years of widespread distribution of passenger cars. The elements of the future system are here—the development into a system depends very greatly upon what the manufacturer does with it during the next five years. If the retailing of passenger cars is standardized with too much uniformity and too close a supervision from the factory, the sale of passenger cars will be limited by the character of the system itself. If the manufacturers arrange matters with the dealers so that the main problems are understood, and the main interests of passenger car sale and service are covered, and if these matters are followed up with a better type of co-operation and discussion, the distribution, as far as retailing is concerned can be gathered together in the next few years and welded into an actual system out of the diversified elements at present in the field.

### *Greater Knowledge of Retailing Needed*

In general, the retailing of passenger cars requires an improvement in the selling methods, an understanding of turn over in its relation to capital and profit, better acquaintance with financing, more careful cost consideration, in the extension of service and conduct of repairs, a more definite understanding of the local needs in connection with supplies and accessories, a greater understanding of the manufacturer's policy and position, and a development with the manufacturer of thoroughly understood contractual arrangements with reference to the handling of used cars, the cost and character of service, etc.

This is a work which depends upon the growth of a better understanding between the manufacturing and the retailing branches of the industry, and, particularly, between the individual manufacturer and his retail dealers. It calls for a method of square dealing not only, but in addition intensive attempts to develop strong dealers by putting the facilities of the manufacturer's wider experience and information at the service of the dealers for their improvement and development. It is said that there are only 8,000 dealers in the field today, rated at \$10,000 or over. Only a comparatively



small number of dealers, so-called, are strong business houses. The manufacturer requires, however, a much larger number of dealers, than 8,000 for the distribution of cars in this country. The number of worth-while dealers in passenger cars is, however, probably not more than 40 per cent of the total in the field.

It is the business of the manufacturer to see that his own sales possibilities are limited very strictly in accordance with the efficiency, the ability, and, to some extent, the number of his outlets. It is his important interest to see that the dealers are given the opportunity and encouraged to reach higher standards of efficiency so that the business may be stabilized all through, the markets thoroughly canvassed, the local influence of a character that will breed confidence, and the whole atmosphere surrounding the distribution of cars one of development.

### *Manufacturers Should Encourage Associations*

In the face of the present confusion, the problems of the manufacturer in connection with his distribution may lead to errors of development just as easily from a desire of speedy solution as they may lead to a lack of development from the tendency to avoid facing the entire issue.

One of the steps the manufacturers could take would be to encourage strong associations of dealers all over the country with their national affiliations through the present National Automobile Dealers' Assn. or some similar body, and with well defined programs of education through their own memberships for the stabilizing of the business. Followed up by the work of the individual manufacturer with his individual dealers, these developments would have a very great effect upon present problems and be of great service in clearing up the present confusion and in clarifying the situation generally.



## New Models, New Engines, New Equipment

### Marmon Making Four-Passenger Speedster

COMFORT, speed and dependability are among the chief qualities of the new four-passenger speedster just introduced by Nordyke & Marmon Company.

The appearance of length and lowness is based on actual figures as well as impressions. The over-all length is 186 in., a figure larger than that of any other model, not even excepting the seven-passenger touring and closed cars. The height is 73 in., materially lower than that of any other of the Marmon line except the two-passenger speedster.

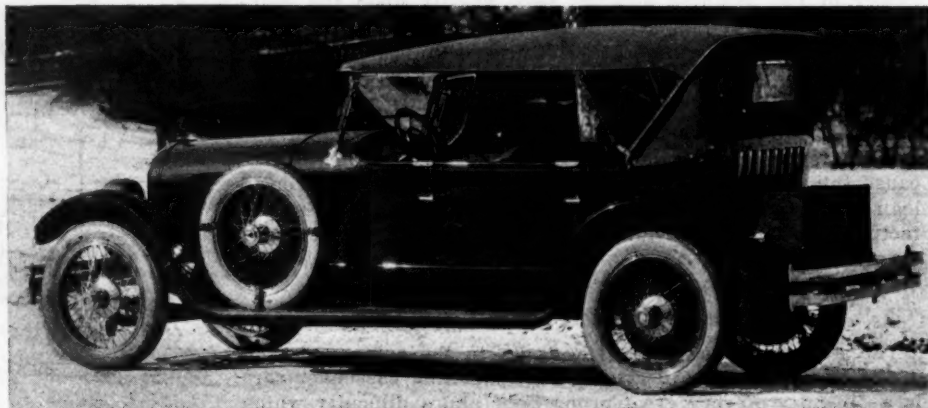
Finished in dust-proof gray and upholstered in gray Spanish leather or in coach blue and black enamel leather, the exterior and interior appearance of the car appeals.

Equipment differing from that of the usual open car includes a trunk rack with trunk and cover mounted on the rear. The spare wheel is mounted in a saddle sunk in the left-hand running board.

Other specifications include top bows of natural wood with nickel-plated mountings, nickel-plated gear shift lever and steering column.

A compartment in the rear makes a convenient place to carry small packages as well as the curtains and other equipment.

The price of the four-passenger speedster f.o.b. Indianapolis is \$3950.



New Marmon speedster which has unusual carrying space. The car has many nickel trimmings and the trunk is regular equipment



The Tuarc wheels, deluxe Boyce motometer, windshield wings, bumpers and special paint job on this new super-sport model Oldsmobile are standard equipment

### Fuller Gearset for Medium Sized Cars

TWO new passenger car transmission gearsets for medium size cars and for larger cars have been brought out by Fuller & Sons Mfg. Co. Both have three speeds forward and one reverse.

One of the features is the short heavy construction of the mainshaft and countershaft. This is designed to relieve the two shafts of any possibility of springing apart where there is a heavy pressure on the gear teeth and to give longer wear for the gears, less vibration, and a quieter transmission. Provision is made on both models for attaching a tire pump. A transmission brake bracket may be attached to the rear of the transmission to accommodate Norwalk or similar transmission brakes.

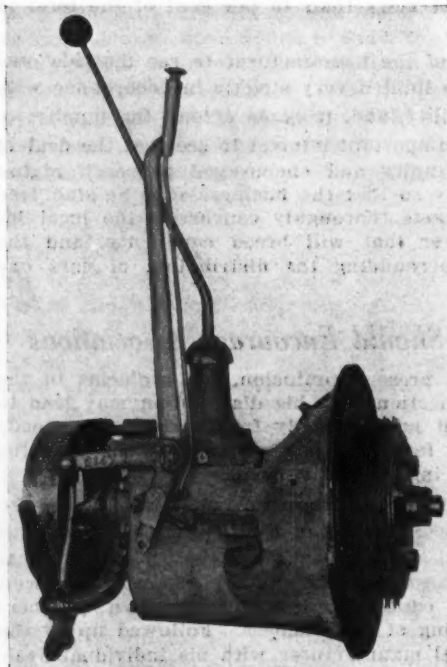
Another convenience is the oil level filling hole. When the oil is poured into the top of the filler hole the oil level in the transmission is correct. The clutch throwout bearing is lubricated automatically by the gearset oil.

The countershaft of the model F for medium size cars has different construc-

tion than heretofore used in Fuller transmissions. The countershaft gears are cut in one piece. These gears revolve on a stationary countershaft with Hyatt roller bearings. The inside of the gears and the countershafts after hardening are ground true to assure gears revolving on true centers, for quietness and life.

Model TU-5 transmission is for six-cylinder engines up to 400 cu. in. piston displacement. The clutches in both models are the standard Fuller multiple disk construction which is standard equipment on a number of makes. The drive is through hardened steel pins to hardened saw steel disks faced with asbestos fabric facings. The driven disks are also hardened saw steel to hardened steel pins ground for true rotation.

New Model F Fuller transmission gearset designed especially for use in medium sized passenger cars. The plug in the side is for oil filling and determines the correct height of lubricant.



Fuller gearset, showing method of mounting brake. Oil filler hole denotes correct height of lubricant

## Oldsmobile Sport Model

A NEW body known as the model 47 super-sport car with a number of items as additional equipment which are standard on this model, has been put out by the Olds Motor Works. The car is upholstered and completely trimmed in maroon leather. It is painted jersey brown. The car is equipped with Tuarc disk wheels, individual cast aluminum bracket type steps with molded rubber tread and individual bicycle type fenders

with splash aprons. In addition, the following features are standard equipment: Gabriel snubbers on rear, triple bar steel bumpers, Boyce deluxe motor-meter mounted on a bar type of radiator cap, windshield cleaner, cigar lighter, double plate-glass windshield wing, stop signal, cowl ventilator, spot-light mounted on left front fender apron, step light for both rear doors and a bevel glass, rear-view mirror. There is a leather top boot and a carrier for two extra tires. This car, complete, as described, is priced at \$1825.



The Jackson kerosene burning engine. The valves are at the side and each cylinder is fitted with two pistons. Accessibility is one of its features

## Jackson Engine Designed for Burning Kerosene

A KEROSENE burning engine with a two-piston-per-cylinder construction and which otherwise differs materially from conventional practice has been put into production by the Petroleum Motors Corp., Rockford, Ill. The engine is designed especially for trucks of three to four tons capacity.

The engine operates on the four-cycle principle and has two pistons and two connecting rods per cylinder.

The top pistons are placed with the heads toward the head of the bottom pistons. The bottom pistons in cylinders 1 and 2 work in unison with the pistons in the top of these cylinders. The rods of the upper pistons are necessarily longer than the others and are placed 90 deg. from them on the crankshaft. The top and bottom pistons do not, therefore, travel at the same rate of speed. Pistons in cylinders 3 and 4 also operate together.

There are four cylinders, cast in pairs, each pair being identical and interchangeable. The bore is  $4\frac{1}{4}$  in. The

piston displacement is 369.7 cu. in. and the S.A.E. rating 28.9 hp.

With the two piston construction each of which has a different speed, a high state of turbulence is created during the compression cycle and it is claimed, therefore, that the whole volume of charge is at the same temperature at the time of ignition. Each time the pistons travel towards each other the action might be likened to two heat waves coming together to compress the fresh charge. Owing to the absence of a water jacket at the top of the engine as in the conventional type of engine no heat is imparted.

On the contrary, the upper piston is as hot as the lower piston at all times and as mentioned before makes possible the same temperature over the whole volume of charge. Water is, of course, maintained around the cylinders. Each cylinder is completely surrounded by the water jacket. The peculiar layout of the pistons and cylinder is said to aid in keeping the walls of the combustion chamber and spark plugs at a lower av-

erage temperature, eliminating local hot spots as well as producing a more homogeneous mixture. The firing order, 1-3-2-4, unusual for a four-cylinder, is such that no two adjacent cylinders receive heat consecutively.

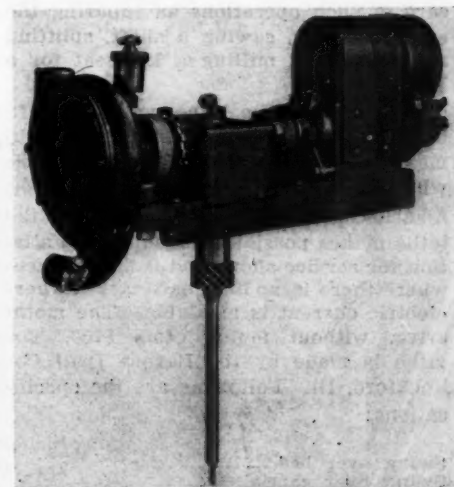
The combustion chamber is spherical at the time of explosion. On the intake stroke the pistons recede from each other and thereby produce a high vacuum in the cylinder. The gas enters and is compressed by the lower piston ascending and the upper piston descending. The two come together practically at the same time excepting for the 90 deg. difference in the crank throws.

This compresses the gas very rapidly. With the lower piston at its highest point and the upper piston 90 deg. from its lowest point the gas is exploded. Thereupon the lower piston descends while the upper piston ascends for a period of 90 deg. crank travel. When the upper piston starts on its down stroke the rate of travel is comparatively slow because at this point it is at its dead center. The lower piston at this moment is travelling at its highest rate and exerting its greatest effort on the crankshaft. The port leading to the exhaust valve is uncovered by the lower piston. The spark plug is very long so that the spark occurs close to the center of the spherical combustion chamber.

Outwardly the engine resembles conventional designs.

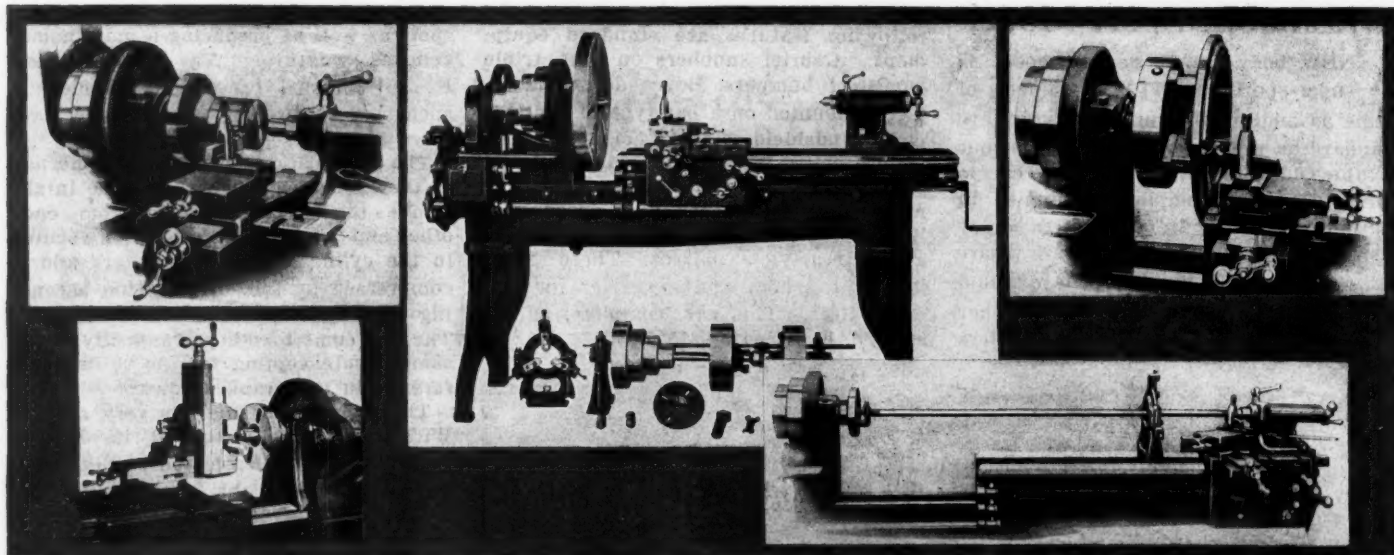
Conventional type of poppet valves are placed at the side of the engine and these are operated by mushroom type of tappets. The camshaft is driven by gears in the usual manner. The design of the engine makes the valves very accessible.

The upper pistons are easy to get at. It is not necessary to remove twenty or thirty bolts to take off a heavy water jacketed cylinder head, nor is there danger of spoiling a gasket or draining the water from the cooling system. It merely is necessary to remove the light aluminum cover and take out the wrist pins and pistons. This operation can be done in five minutes.



The water pump and magneto can be removed as a unit from the Jackson engine





Details of the Barnes lathe, made especially for automotive shops. Upper left, turning a piston. Lower left, milling a key seat. Center, lathe and attachments. Upper right, machining a flywheel. Lower right, turning taper on drive shaft

## Barnes Sliding Extension Gap Lathe

BY MEANS of the sliding extension gap feature of this lathe, a variety of operations usually encountered in the automotive repair shop can be handled. With the addition of the milling attachment which the company is prepared to furnish the lathe becomes a universal machine for cylinder reboring and milling jobs, as well as for all ordinary lathe work. Usually it is impossible to apply the reboring attachment to the standard 14 or 15 in. lathe because the cylinder block generally requires the extension gap.

The sliding extension gap makes it possible to take between the centers a long propeller while turning a taper on the end for the pinion. Likewise it is possible to swing a flywheel in a chuck from the headstock because of the gap. Practically all classes of piston work can be handled as well as work on crankshafts. The milling attachment takes care of such operations as squaring the ends of shafts, sawing a shaft, splitting a bushing and milling a key-seat for a Woodruff key.

The price of the lathe, with a 5½ ft. bed but without cylinder boring attachment, milling attachment, etc., is \$700, while the price with a 7½ ft. bed is \$750. A self-contained motor drive for the lathe makes possible convenient installation for service shops and isolated places where there is no line shafting, but where electric current is available. The motor drive, without motor costs \$100. The lathe is made by the Barnes Drill Co., Rockford, Ill. Following are the specifications:

Swing over bed.....	Inches 14½
Swing over carriage.....	10
Swings through gap.....	24
Cone diameters.....	10, 8, 6 and 4
Width of steps on cone.....	2½
Width of top bed over all.....	11½

Hole through spindle.....	1-9/16
Diameter of spindle nose (4 threads per inch).....	2½
Front bearing of headstock spindle.....	2-15/16x3-7/16
Back bearing of headstock spindle.....	2¼x2¼
Diameter of tail stock spindle.....	1-13/16
Head spindle has Morse taper No. 5 and is fitted with No. 4 Sleeve.	
Ratio of back gearing.....	11 to 1
Feed screw 1 in. diameter, Acme Standard.	
Slot in tool post takes ½ x	

1½ in. tool.	
Lengths of bed regularly furnished.....	5½ ft. 7½ ft.
	Inches Inches
Center Rest takes in.....	4 4
Angular travel of compound rest.....	3 3
Lathe takes between centers, closed.....	36 60
Lathe takes between centers, extended.....	54 96
Lathe gap opens.....	18 36
Size of friction pulleys on countershaft.....	10 x 3 10 x 3
Speed of countershaft, 200 revolutions per minute.	

## New Buda Engine Designed For Light Commercial and Other Use

THE Buda Co. has added a smaller model engine to its line. It is a heavy-duty, high speed type designed for light commercial or other use where a four-cylinder, 3½ by 5½ in. engine would be practicable.

The engine is designed for three-point suspension with the rear supporting arm cast integrally with the upper half of the crankcase and arranged with main frame supports. The forward end of the engine is supported at the crank center by a trunnion bracket arranged to rest upon a drop cross-member of the frame.

The cylinder block is provided with large water jacket space baffled so the water is discharged directly beneath the valves and designed to secure circulation around each valve. The spark plugs are located in the cylinder head, the threaded part of the spark plug in contact with the water head being entirely surrounded by water. The water outlet on the cylinder head is fitted with a removable elbow which may be placed in four different positions. In fact, the entire engine has been laid out to be as universal as possible in its installation.

One of the features which may be mentioned from an accessibility standpoint is that the cylinder head is provided with a ledge projecting beyond the

block, which makes it possible to remove the head without damaging the gasket, and, at the same time, with a saving of considerable time. Lugs on each end of the cylinder and head are provided for breaking the joint in removing.

The gray iron pistons are fitted with concentric rings above the wrist pin and one wiper ring in the lower part of the skirt. To prevent the piston pin from working through against the cylinder barrel there are two locks on the piston pin, one being an alloy steel lock screw with two diameters and extending through both sides of the pin to give double shear and prevent improper fitting of the pin at any time. The second is a spring retainer ring which expands in grooves turned in each end of the piston bosses.

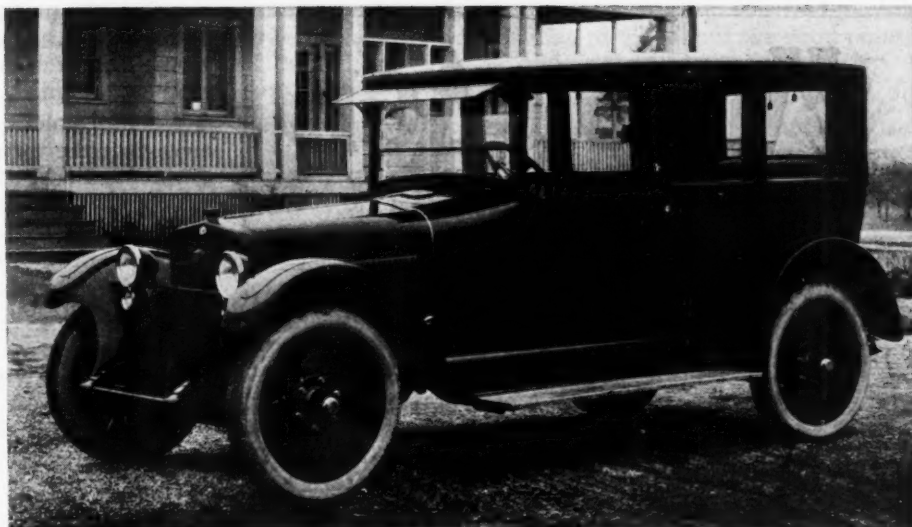
The working surface of the cams on the camshaft and the three camshaft bearings are given a ground finish. The valves are driven through mushroom type pushrods, fitted with removable guides. The pushrods are made large to permit the use of large diameter adjusting screws, as well as to maintain correct alignment. The heads of the adjusting screws are fitted with oil-hardened steel blocks to facilitate alignment and eliminate warpage caused by case

hardening. The large bearing area at this point also permits of low unit pressure at the adjustment and consequently minimizes wear. To facilitate removal and permit adjustment of the valve tappets, the cover is split into two sections.

Pump water circulation is used, the centrifugal pump having a bronze runner and large packing glands. Bronze sleeves are fitted over the pump shaft to prevent rusting and pitting and the pump is made up as one assembly unit so that the water pump and its drive-shaft may be removed as a unit or separately. The engine can also be arranged to take the thermo-syphon system.

Full pressure feed lubrication provides oil for the crankshaft, camshaft bearings and connecting rod bearings. Oil is forced to the main bearings and camshaft bearings through a seamless steel distributing type which is cast in the crankcase. Oil is forced from the main bearings to the connecting rod bearings through a drilled passage in the crankshaft. A pressure regulating valve is provided, the oil being pumped from the oil reservoir, which is located beneath the crankcase, by a geared pump located in the center of the oil reservoir and attached to the upper half of the crankcase to make it independent of the oil pan. The pistons and cylinders are lubricated by oil thrown from the lower ends of the connecting rods. The timing gears are fed positively from the pressure system. The extra wiper ring on the lower end of the piston is designed to prevent an excess of oil reaching the combustion chamber and a double throw ring back of the rear main bearing is designed to prevent oil leakage into the bell housing. There is a settling chamber for sediment in the bottom of the reservoir below the oil pump, from whence it may be drawn off from time to time.

All of the accessories are accessibly arranged and may be readily detached. The engine complete weighs 646 lb. with flywheel.

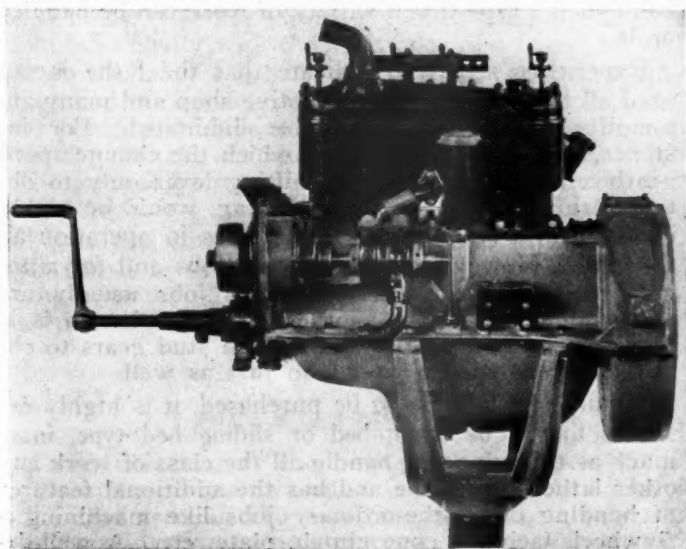


### Wills Sainte Claire Imperial Sedan and Town Car

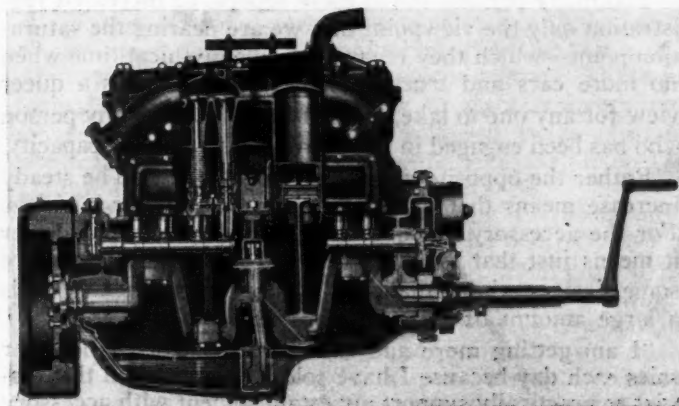
**T**HE Wills Sainte Claire Imperial sedan is a cross between the conventional limousine and the usual sedan design. A glass partition which can be raised or lowered at will divides the in-

terior into a front and rear compartment. When the owner is driving, the partition is lowered.

The limousine and the town car have the same dimensions as the sedan, except that the distance from the front of the back seat to the back of the front seat is 48 in. and the distance from the front of the front seat to the dash is 24 in.



Left side of the Buda engine. Note the oil filler opening on the top of the cylinder block and also the accessible location of pump. The engine is three-point suspended when in a chassis.



Sectional view of Buda engine. The lugs at the ends of the cylinder block and head will be noted. These are for ready removal of the head without danger to the gasket.



# MOTOR AGE

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## Our Enlarging Field

THERE are in round numbers 10,500,000 motor cars and trucks in this country. That figure was made known from the registration of cars and trucks during the year 1921. We have all read in the news reports that factories are speeding up production this year because there is a buying demand and so there will be another increase next year.

Too many persons see in these reports of increased registration only the viewpoint that we are nearing the saturation point—which they regard as some mythical time when no more cars and trucks can be sold. That is a queer view for any one to take, most of all a dealer or any person who has been engaged in this great industry in any capacity.

Rather the opposite view is the one to take. The steady increase means that much more opportunity for business. For the accessory or equipment manufacturer and dealer it means just that much bigger field for sales. There are some dealers who visualize this. A car dealer who sells a large amount of equipment said the other day:

"I am getting more and more independent of new car sales each day because I have sold enough cars in this district to practically support my establishment with accessory sales and maintenance work. But that does not mean that I am letting up. I see much more in the sale of a

car than the profit the deal represents. My car customers keep their cars on an average of four years. That means to me that each time I sell a new car I have made a direct connection with a man who is to be a steady customer of my establishment for four years. I sell 90 per cent of the tires that the owners of my cars use and I believe that I get about that per cent of all motor car money they spend except that for oil and gasoline."

This man has a large view of his business prospects. He is working on his list of car owners constantly. He keeps in personal touch with them. His next remark also was interesting:

"A used car sale to me means tying up a prospect for one of my new cars. I endeavor to interest the buyer of a used car in my establishment and to sell our establishment to him so thoroughly that he will believe that this car, if it is some other car than the one we sell regularly, performs well it is because it is taken care of by our establishment."

This man takes the big view of the increasing number of his cars in use, just as every dealer in automotive goods should view the registration in general and particularly in the case of the cars or trucks in which he is especially interested.

This is just as true of the car dealer and manufacturer as in any other branch of the business. Every new car registered and in use, means that another man—or more likely a family—has been thoroughly sold on the motor car or that a business has been sold on the motor truck. Mighty few persons ever give up the car or truck. Rather than give up the vehicle, the owner becomes a better business man or a more earnest wage earner in order to assure himself that he will not have to give up the vehicle. Also he is educating his children to the motor car or truck standard so that they will put forth their best efforts to come into that financial class which will enable them to own a vehicle. It is a work that keeps on spreading and the end is not yet beginning to be in sight. It is bringing about business and social change that appear to be abundantly able to support a continued increase.



## The Lathe for the Automobile Shop

ANY lathe for the automotive repair shop in order to be thoroughly practical and with the assurance that it ultimately will pay for itself, should be of such a type that a variety of work can be handled on it.

Experience seems to indicate that the lathe is not used all the time in the automotive shop and many automotive features can well be eliminated. For instance, a back geared lathe in which the change speed gearbox is provided with a shifting lever only to obtain various speeds for screw cutting, would be highly essential in a shop where the lathe is in operation all the time. However, for occasional jobs and for automotive repair work where no two jobs usually are alike from one day to another, a lathe wherein it is necessary to remove the driving and stud gears to obtain different speeds would do just as well.

If only one lathe is to be purchased, it is highly desirable that it be a gap-bed or sliding bed type, inasmuch as this type will handle all the class of work any other lathe will handle and has the additional features of handling out-of-the-ordinary jobs like machining a flywheel, facing a cone clutch, plate, etc. A well-designed gap-bed lathe will not be appreciably weaker than the straight bed type.

The lathe when fitted with such auxiliaries as a tool post grinder and milling attachment makes it possible for the shop to handle almost any kind of work, such as cutting keyways in shafts, milling the ends of tapered shafts for Woodruff keys, etc. Shops doing electrical work will find the lathe useful for truing up starting motor and generator commutators, roller tracks in timers, etc.

In order to make the lathe as useful as possible it is desired that the tail stock be cut away to permit of the compound rest to be swung around to an angle of 90 degrees. The tail stock should, of course, be adjustable for taper turning.

To handle all classes of work the garage or service station lathe should be equipped with a large and small face plate, follower rest, compound rest, centers, four jaw independent chuck, a drill chuck, set of dogs, turning and boring tools and wrenches.

Many thousands of cars no longer in production are in use, especially in the rural sections of the country, and it daily is becoming more and more difficult to get parts for these cars. The shop, large or small, which possesses a lathe is in position to make these parts and thus holds a distinct advantage over a shop not so equipped. More and more farm tractors and trucks are coming into use and if a farmer is forced to do without his tractor or truck at certain times of the year pending the arrival of new parts, it may mean serious loss. A lathe in a shop at such times reduces the time lost to a few hours, instead of days.



### Paying for a First Class Job

**W**E FEEL quite certain that motor car service is getting better as time goes on. The service station and repair shop is becoming a real factor in many communities and is looked upon as a legitimate business proposition. Still there are many instances of where a shop falls down miserably on a job. Probably in the majority of cases such instances come about without the full knowledge of the man in charge, but at any rate they show the need for thorough inspection of every important job by a competent foreman or inspector.

The other day a car owner complained to us of such a job. He had had the rear axle of his car repaired. It was noisy after the service station turned it over to him. So finally with the assistance of a friend he took down the axle. The bearings were loose in their mountings and the service station mechanic had taken a center punch and made a series of burrs on the outer race surface to take up the play. Certainly a botch job. The job had been turned over to the man as being first class work, but was it?

It is that sort of practice which has turned many a car owner from the service station. A rigid system of inspection would have prevented it. The car owner was willing to pay for a first class job, but he didn't get it.



### Look Pleasant, Please

**S**OME men carry about with them a grouch that becomes so real to them that they cannot see a bright ray even in their own business when it is brought to their attention. The writer was talking with an automotive dealer a few days ago who has an undying hatred of one organization in this business. Most of that conver-

sation was about this particular company. In fact, it was rather difficult to get this man to talk about the good points of the vehicles that he sold.

This man, or any other man who permits a grouch to occupy most of his mental and vocal effort, cannot be true to himself nor make the most of his possibilities. A man should believe in his own business and its possibilities and he should talk of these in order to get other people to believe in him and his cause. No man ever got big by tearing down other business. The tearing down process is a natural result that is likely to take place if the man having the opposition believes in himself and his product firmly enough, and if he and his product are worth the belief.

The prospects are very good for spring business and this is not the time to nurse a grouch. If each of us is going to get the very best out of the spring trade, each of us must boost our own business, not worry about the other fellow. If we boost our own particular part of the industry, we actually will get to believe in the entire industry in the near future.



### Sam Miles on Salesmanship

**I**N this issue you will find some comment on the Chicago show by Sam Miles, the veteran manager of National Shows. Mr. Miles originated the National Show idea and has probably been the closest student of these annual exhibitions. He also has been a close student of the problems of the automotive dealer and his heart is entirely wrapped up in the success of the industry.

So the remarks that Mr. Miles may make concerning the sales effort in the Chicago show are not a mere passing impression of a man who looks in on the industry for a moment. It is the comment of a man who has watched this industry grow from a small adventure to an amazing industry and his thought is to bring home to the manufacturer and dealer the problem that confronts them.

Selling of automotive vehicles is the problem of today. This must be accomplished by the salesmen who represent the factories and the dealers with the customers. Mr. Miles suggests in his comment that these men get to work. Some of the salesmen, of course, do work and they automatically are handsomely paid for their efforts, but it would appear to be better if some of the present salesmen were fired and the cars were permitted to sell themselves, rather than have the handicap of the representation that some of them had at the Chicago show.



### N. A. D. A. Progress

**I**NFORMAL accounts of what has been happening in the National Automobile Dealers' Association efforts to line up a membership on the "One of a Thousand" program are highly encouraging. These informal advices indicate that in practically every city where this program has been explained, twice as many applications have been filed as were necessary from that community to make the "one thousand."

It will take a considerable period for this program to be explained to dealers throughout the country, as it is the sort of a program that requires a personal presentation rather than the printed word. In the meantime a large number of highly reputable dealers are making their personal applications and obtaining the endorsements for their selection for a membership. In doing so, these dealers find that their indorsers, as a rule, need only some such a request to get them active in seeking a membership.



# Starr Makes Bow In Washington

## Specifications of Starr, New \$348 Ford Competitor

**Durant Unveils Vehicle In Washington and Takes Orders for June 15 Delivery**

WASHINGTON, D. C., March 10—The Starr car, to be manufactured by Durant Motors, Inc., to sell for \$348, made its first public appearance here today when it was shown in the sales rooms of Harper Brothers, local Durant dealers. This new car, which for the present will be turned out from the Long Island plant, of Durant Motors, is promised to be in production by June 1. The distribution, sales and servicing of the Starr will be in the hands of Starr Motor Car Co., an independent company.

The Starr car resembles the Durant Four in many details. This might be expected as both cars were designed in a large part by the same engineers. Although the component parts are produced by various parts makers they have in nearly every instance been especially designed for use in the Starr. The piston displacement of the engine is somewhat less than that of the Ford, but the wheel base of the new car is two in. longer, being 102 in.

The engine is a Continental, of the L-head type with cylinders and crank case cast in block. The lower half of the crank case is pressed steel and the cylinder head is detachable. The engine is said to develop a maximum of 35 hp. at 2500 r. p. m. The bore is 3½ in. and the stroke 4¼ in., giving a rated horse power of 15.63, as compared with 22.5 for the Ford.

The camshaft and the combined generating and ignition units are chain driven. The cooling water, circulating pump is driven off an extension of the

generator shaft. The chain is arranged in a triangular layout and is enclosed by a sheet metal cover. The inlet and exhaust manifold are cast with one common wall which acts as a hot spot. A Tillotson carburetor is used and it is fed by a Stewart-Warner vacuum system from the main tank located at the rear. A hot-air stove with short pipe connecting with the carburetor inlet is also provided.

The generator and ignition unit are located on the right side of the engine just back of the chain case. The cutout is located on the side of the generator and the coil is mounted on top of it. The distributor is located at the rear of the generator and comes at about the center of the engine, which permits the use of short, high-tension cables. The flywheel is toothed but the starting motor is not included as standard equipment.

(Continued on page 28)

## INDUSTRY INCREASES FORCE

Detroit, March 10—Substantial evidence of steadily increasing production in the automotive field is found in the employment reports of the 79 firms which are members of the Employers' Assn. The statistics for the first eight weeks of 1922 follow:

Week Ending	Number Employed	Net Change
January 2	60,981	Inc. 8,795
" 10	102,485	41,534
" 17	109,703	7,218
" 24	111,615	1,912
" 31	113,099	1,484
February 7	115,092	1,993
" 14	118,647	3,549
" 21	121,048	2,407

## MACK WOULD BE MACK

New York, March 13—The International Motor Truck Co. has called a special meeting of its stockholders for March 22 to vote on changing the name of the company to Mack Trucks, Inc. The annual meeting will be held the same day.

## Unusual Efforts Move Used Cars For Cleveland Dealers

**All Vehicles Placed In Best Possible Shape and Given Special Sales Rooms**

CLEVELAND, March 13—Cleveland retail automobile dealers never have put so much energy, so strong merchandising efforts and so much time on the sale of used cars as they have this year.

They are operating on the theory, according to several, that the used car will be a problem as it is not handled like any other ordinary business. They are a unit in agreeing that if it is handled in the same manner that a grocer handles his business, or a new car dealer handles his business, there will be no used car business.

Two of the most important steps that have been taken by dealers to dispose of their used cars has been the elimination in nearly every instance of sales on "the as is basis," and the taking of steps to put the used car business on a higher plane. The second accomplishment was brought about by the opening of sales rooms in different buildings from those in which the new cars were handled for the disposal of used cars.

The successful and big money making dealers are just as careful to see that the sold used car is in as just as good condition as it is humanly possible to make it before it leaves the salesroom. No more pains are taken in this respect with the new cars that are sold.

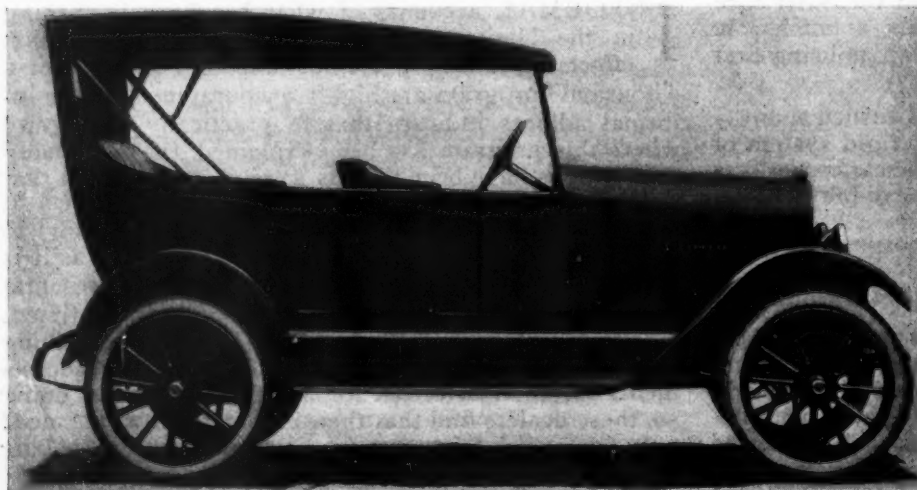
The advertising campaign for sales of used cars was never carried on to such an extent as it is this year. Here are some samples:

The Stuyvesant Motor Co., Hudson-Essex distributors, says in its ads: "You can learn from our permanent book records every new part that has gone into and every lick of work which has been expended on any used car in our tremendous stock—no guess work when you buy a used car from Stuyvesant."

## FIRESTONE ESSAY CONTEST

Washington, March 13.—For the third consecutive year a four-year university scholarship is being offered high school students by the Highway and Highway Transport Education Committee. The scholarship, which is being given by Harvey S. Firestone for the best essay written on the subject, "How Good Roads Are Developing My Community," is an award to encourage the study of highway economies. The essays must not exceed 700 words in length, they must be submitted not later than May 1 and all students of high school grade are eligible to compete.

## New Starr to Sell for \$348



# March Schedules Are Increased

## California State Convention Refuses to Act as Salesman

### Denies Use of Headquarters as Sample Room—Endorses Control of Headlight Adjustments

SAN JOSE, Cal., March 11.—Two important steps were taken by the northern division of the California Automobile Trade Assn., which held its annual convention here. The more important of these was the unanimous decision that the association would not give its endorsement to any commodity offered for sale. The decision was made when a communication from the Orange County Automobile Trade Assn. was read, suggesting that samples of a certain demountable rim be kept in the office of the secretary of the association, and attention directed to it, such action on the part of the secretary resulting in the payment of a certain percentage on the sales of the rim to the association, thus assisting in the defraying of the expenses.

Robert W. Martland, secretary-treasurer of the state association, read the reply which refuses to allow the association to be used as a salesman or agent, or its rooms to be used as display rooms for such merchandise. This letter was approved.

### Headlight Adjustment Important Step

The other important step was in regard to the adjustment of automobile headlights, which the California Automobile Trade Assn. is going to endeavor to control through headlight-adjusting stations throughout the state.

Martland explained the plan in detail. Certificates are to be issued by all official headlight-adjusting stations, and will bear the wheel-and-radiator seal of the California Automobile Trade Assn. On the back of the certificate will be a note to the motorist from the California State Motor Vehicle Department to the effect that the department recognizes such certificates as evidence that the headlights on that car have been properly adjusted at the date mentioned, to comply with all legal requirements. Official adjusting stations will be carefully selected, and the men who do the actual work of adjustment will be educated and trained as illuminating engineers before being allowed to make the adjustments.

The stations are to be located in the cities, towns and along every main-traveled highway. The certificates, of course, will furnish no protection from arrest, but as each arrest will be endorsed upon them, and as the motorist who has no certificate will be considered as having failed to have his lights adjusted to comply with the law, it is believed that the

result will be much better illumination, and greater safety in night driving.

About 100 members of the division were present when George Haberfelde, of Bakersfield, president of the association, took the chair. Many telegrams were read from members who could not attend, the most prevalent reason being an improvement in business which pre-

(Continued on page 30)

## McGregor Funeral Closes Ford Plants for One Day

Detroit, March 15.—Plants of the Ford Motor Co. both in Detroit and Windsor were closed Tuesday when the funeral of Gordon M. McGregor, president of the Ford Company of Canada was held. Mr. McGregor died Saturday, aged forty-nine, having served for almost twenty years as president of the company which he organized in 1903. That year Mr. McGregor succeeded his father as president of the Walkerville Wagon Works.

No time has yet been set for the directors to act upon the successor of Mr. McGregor. Wallace Campbell, secretary, assistant treasurer and assistant general manager, is looked upon as the most likely successor.

### PLAN CHRYSLER SIX

Toledo, March 11.—Frank Kennison, one of the receivers for the Willys Corp., has been informed that Clement Studebaker, Jr., Rollin H. White, president of the Cleveland Tractor Co., and Fred Zeder, former chief engineer of the Studebaker Corp., who designed the Chrysler six, are working out a plan to finance the purchase from the Willys Corp. of the rights to manufacture the Chrysler six and have taken some preliminary steps in this direction. It is reported that if they are successful in their efforts the car will be produced at the plant of the tractor company in Cleveland.

### HAYES WHEEL EXTENDS SERVICE

Jackson, Mich., March 13.—The Hayes Wheel Co. has greatly extended its replacement service on wire wheels. Formerly this service was extended only on Ford wheels. A revised catalogue just issued for the trade describes replacement parts for Ford, Chevrolet, Nash, Earl, Durant and Dodge cars. The catalogue illustrates and prices complete wheels and all parts and special section is devoted to rims.

### COLUMBIA MOTORS ORDERS

Detroit, Mich., March 13.—Columbia Motors Co. has orders on hand for 4000 new light-six cars for delivery before July 1, members of the Detroit Stock Exchange were told yesterday at a special meeting staged by advertising counsel of the company.

## Month's Production Gain Is Placed at 40 Per Cent

### Sharp Upturn in Retail Sales Features Early Spring Market Conditions Nationally

NEW YORK, March 14.—Production of passenger cars and trucks for February showed a material increase over January. This gain probably was as large as that of January over December which was about 40 per cent, exclusive of Ford. Output was very much larger than in February, 1921.

Highly optimistic reports in regard to the volume of orders received continue to come from Detroit. They are accompanied by announcement of increased production. Several companies, including Dodge, with 600 a day, Maxwell with 200 a day, Studebaker 400, Cadillac 100, and Hupmobile are approaching a maximum production. Ford is speeding up his output both at the Ford and Lincoln plants. Chevrolet has fixed a schedule which calls for an output of 50,000 by July. The Rickenbacker is going into quantity production and the output of Durant Fours is being speeded up as rapidly as possible. Other companies which are increasing their schedules are Reo, Paige, Dort, Columbia, Liberty and Wills.

Employment in Detroit has shown a steady and really remarkable increase week by week since the close of the inventory period after Jan. 1. Employment in automotive plants is slowly but steadily increasing in all parts of the country.

There has been a sharp upward turn in sales at retail, both cars and trucks, in all sections. As a consequence, dealers

(Continued on page 28)

### CHICAGO TRADES ELECTION

Chicago, March 14.—At the annual meeting of the Chicago Automobile Trade Assn. held last night at the Congress hotel, the following officers were elected: President, Thomas J. Hay; vice president, Dayton Keith; secretary, James Levy; treasurer, W. J. Boone; directors, O. G. Heffinger, C. W. Stiger, and Clarence E. Eldridge. Jay A. Colvin and E. J. Kilborn are hold-over directors from last year.

### JANUARY BANNER HUPP MONTH

Detroit, March 13.—President Hastings of the Hupp Motor Corp. announces that shipments in January were the largest for any January in the history of the company. He reports that four times as many cars were shipped in January last as in January, 1921, twice as many as in January, 1918 or 1916, and three times as many as in January, 1919.



## Specifications of Starr, New \$348 Ford Competitor

### Durant Unveils Vehicle in Washington and Takes Orders for June 15 Delivery

(Continued from page 26)

Oiling is by combination splash and pressure. The oil is fed under pressure through the hollow crankshaft to the main bearings. The fan is belt driven from the crankshaft. Both manifolds are located on the left side of the engine. The engine has four-point suspension.

The clutch is of the single plate type and is virtually the same as the one used in the Durant Four. The gearset, mounted amidships, provides three speeds forward and reverse. The rear axle is of the semi-floating banjo type, built by the Timken company. The bevel gears give a reduction of 4% to 1. The brake drums are 10 in. in diameter with internal hand brake and external foot brake. A rear cover plate permits ready access to the differential, which may be removed through the opening. Timken bearings are used for the wheels and differential. The front axle is also a Timken.

Semi-elliptic springs are used all around. The rear springs have six leaves, are 48 in. long, 1 1/4 in. wide and are underslung. The front springs are 1 1/4 by 34 in. The muffler is a heavy tubular member which runs fore and aft over half the length of the car and serves as a torsional member for the frame. The frame channels are 1 1/2 in. by 4 in.

Among those who accompanied W. C. Durant at the unveiling were R. W. Judson, president of the Continental Motors Corp.; A. R. Demory, president of the Timken-Detroit Axle Co.; C. B. Hayes, president of the Hayes Wheel Co., and Harry O. Dunn, president of the Fisk Rubber Co. Others in the party were F. W. Warner, former general manager of the Oakland Motor Car Co., and several executives of the Durant companies.

Offices for the Starr Motor Co. have been rented at 511 Fifth avenue. The Durant Corp., which handles stock sales for the Durant enterprises, is located in the same building. The new company has not yet been incorporated and the names of those who will be the incorporators have not been disclosed.

Orders for June 15 delivery of the new car are being taken at Washington and purchasers are guaranteed against a reduction of prices. The Starr will be displayed in other cities before actual production is begun.

Actual count showed that 26,840 visitors inspected the new Starr car at its debut here. Durant expressed himself as highly pleased with the audience and the interest shown in his new product. Salesmen declared that several hundred people had expressed their intention to purchase the new car as soon as it was put on the market.

## JOBBER HOLD BIG MEETING

Portland, Me., March 12—Three hundred and thirty-nine Maine, New Hampshire and Vermont dealers attended a meeting and dinner arranged by the James L. Bailey Co., Farrar-Brown Co. and Post & Lester Co., New England jobber members of the Automotive Equipment Assn. Automotive equipment merchandising was the subject of the meeting and the "Ask 'Em to Buy" film was shown. Charles J. Bailey presided and Ray Lynch, of Post & Lester, made the principal address.

The meeting was the initial step in a co-operative undertaking of the three jobbers mentioned to assist the trade of northeastern New England territory in equipment merchandising, and also in association work. Several local dealer associations already have been formed, or are in process of formation, as a result of these and subsequent meetings engineered by the jobbers.

## Boston Adds Four Agencies As Proof of Sales Increase

Boston, March 3—One of the best evidences that business is picking up in New England is found in the placing of new agencies in Boston. Ordinarily it is very difficult these days to get some one to take on a line that has been dropped, or to take on new cars. But within a week Boston has been able to announce four definite, and two prospective agencies placed.

Frank W. Stockbridge, recently made president and general manager of the Jackman-Jameson Co., handling the Westcott, went west last week and on returning announced that he had added the Saxon Duplex to his line, taking all New England. Both the Saxon and the Moon had been dropped by companies that went out of business. The Rick-enbacker made its initial appearance here Monday at the salesroom of the Stevens-Clarke Co., that handles the Earl and National, and the Liberty was displayed Washington's birthday in its new home a few doors away where A. F. Chandler and James C. Tate, the latter handling Holmes, have quarters. It is expected that a new agency will take on the Ace. The Gray car made its first appearance last week in Boston, too.

## SOLONS STUDY ROAD BILL

Washington, March 13—The senate committee on post offices and post roads took under advisement today the report of a sub-committee recommending a minimum appropriation of \$50,000,000 annually for three years for highway construction. It also is proposed to authorize the expenditure of \$65,000,000 in 1924 and \$75,000,000 in 1925 as part of the federal aid to states. This legislation will be added to the general appropriation bill.

## Month's Production Gain Is Placed at 40 Per Cent

### Sharp Upturn in Retail Sales Features Early Spring Market Conditions Nationally

(Continued from page 27)

have been greatly encouraged and their optimism has been passed along to the factories. March always marks the real opening of the spring selling season, however, and April was one of the best months last year.

Predictions made in some quarters that the four months ending June 1 may establish a record for production undoubtedly are exaggerated although the volume of business will be large. The industry is establishing itself on a solid foundation for a long period of moderate prosperity. Notwithstanding a belated reduction here and there, it is evident prices have been fairly well stabilized. They are not likely to move sharply in either direction for several months.

While it has been expected that cultivation of the agricultural districts for sales in the fall would be profitable, this market for automotive products is producing business on a moderate scale months earlier than had been anticipated. Demand is becoming apparent for cars in the lower price classes and for light delivery trucks.

Business of parts makers naturally is reflecting the better tone apparent in the vehicle building field and the scope of operations is being steadily expanded. The same is true in tire plants where production costs have been lowered by greatly increased labor efficiency.

In spite of very heavy losses taken on inventories, the financial position of the industry at this time is stronger than was believed possible a few months ago. No important companies are in serious difficulties.

Every effort has been made to reduce liabilities and an enormous sum has been paid in the aggregate on bank loans and merchandise accounts. While the loss of \$38,000,000 by General Motors on the year's operations seems exceedingly heavy, that corporation is in reality in a much stronger position today than it was a year ago and a very satisfactory profit for this year is assured.

## FORD DENIES GERMAN PLANT

Detroit, March 13.—Henry Ford denies reports that he proposes to establish a huge branch factory in Germany in which to manufacture cars, trucks and tractors. It is understood this plan was given consideration but later abandoned. An extensive business in Holland and Belgium is being done through the Antwerp assembly plant, which was opened January 1. The territory covered includes Switzerland and Luxembourg. The manager is Don Critchley, formerly of the New York branch.

## Ohio Starts War on Ford Owner's Protective Assn.

### Organization At One Time Wrote Insurance In Michigan, Wis- consin and Indiana

**C**HICAGO, March 13.—The State of Ohio has started a war to the last man against the operation of the Ford Car Owners' Protective Assn., with headquarters in Chicago.

It is declared that the insurance concern has been doing business in Ohio without the authority of the state insurance department and that it has defied the department to interfere with its operations. The company did business at one time in Michigan, Wisconsin and Indiana, until the insurance departments of these states put an end to its operations.

One of the first steps against the association in Ohio came in the arrest of S. M. Green, district manager, under an indictment charging him with selling insurance without a license and for placing insurance with an unauthorized company. It is said that other arrests will follow.

Charles W. Spicer, warden of the state insurance department, speaking on the subject, said:

"It is my opinion that every policyholder in the association is subject to arrest because every policyholder in a mutual or reciprocal company is a principal in the organization. In the future if I have trouble in locating direct representatives I propose to arrest policyholders."

"If other steps fail, we will take action against members of the organization. They are guilty of violating the state law inasmuch as they solicited business and received a small fee for each new member they secured. The penalties for soliciting subscribers to an unauthorized insurance company are heavy and they will be imposed."

### ILLINOIS STATE CONVENTION

Decatur, Ill., March 13.—The third annual convention of the Illinois Automotive Trade Assn. will be held here March 20. With the exception of the time to be given to one speaker of national prominence, the entire session will be given over to the affairs of the association. Every dealer interested in better conditions for the industry is urged to be in Decatur not later than 9 o'clock a. m. on the day of the convention. New officers for the coming year are to be elected.

### ASBURY PARK, N. J., TO STAGE SHOW

Asbury Park, N. J., March 15.—The Asbury Park Automobile Trade Assn. will hold a show here April 10 to 15. A number of the local dealers, including accessory merchants, will have displays.

### TO BOOST LINCOLN PRODUCTION

New York, March 13.—More than 500 Ford dealers from the Metropolitan dis-

trict, New England and New York state were guests of the Ford company at luncheon at the Commodore hotel recently. Several factory representatives were present, including W. A. Ryan, general sales manager.

Ryan referred briefly to the Lincoln car, saying that fifteen a day now were being turned out but that production soon would be increased to thirty-five. He added that Henry Ford expected large sales for the Fordson tractor at the new price.

### EARL REDUCES PRICE

New York, March 10.—Reductions of from \$90 to \$200 on the Earl cars and delivery wagons were announced here today by factory representatives. The new and old prices are:

	Old	New
Touring car .....	\$1185	\$ 995
Sedan and brougham. 1895		1695
Express delivery		
wagon .....	1085	995
Panel delivery wagon 1160		1060

The custom-built roadster remains unchanged at \$1485.

### MAIBOHM CREDITORS' PLAN

Toledo, March 13. Creditors of Maibohm Motors Co. have been granted five days to authorize a new plan for sale of the company to a syndicate of Sandusky citizens represented by A. C. Burch as agent. The new company will be capitalized at \$500,000 in preferred stock of two classes. Class A will be 6 per cent cumulative, dividends commencing two years from date of issue. Creditors will receive this pro rata with their claims finally approved. They will be represented by three directors on the board.

### L. G. PEED IS PROMOTED

Toledo, March 13.—L. G. Peed, for more than a year manager of the Willys-Overland branch in this city, has been named assistant sales manager of Willys-Overland, Inc. R. E. Butler, zone supervisor for Iowa, Nebraska and Missouri, will succeed Peed at the local branch. W. O. Kiracofe, formerly sales manager of the Banting Mfg. Co. here, has been named retail sales manager of the branch to succeed L. J. McCracken, who will have charge of the Pacific coast territory for Willys-Overland.

### CORRECTION

New York, March 10.—The statement that Judge Learned Hand had granted the Hudson Tire Co., Inc., of Newark, N. J., a permanent injunction restraining the Hudson Tire & Rubber Corp. of Yonkers from using the word "Hudson" on its tires was somewhat misleading. The court order permanently enjoins the Yonkers company from the use of the word "Hudson" without "some distinguishing affix thereto." In all other respects the temporary injunction against the Hudson Tire & Rubber Corp. was vacated.

## Milwaukee Street Railway Asks for Trackless Trolley

### Property Owners Agree to Plan But Suggest That Company Be Re- sponsible for Pavements

**M**ILWAUKEE, Wis., March 13.—As the result of the success experienced by the Milwaukee Electric Railway & Light Co. in the operation of a number of motor buses as connecting lines to regular street car traffic arteries and similar uses, the utility has now applied to the Milwaukee common council for permission by ordinance to place in operation a "trackless trolley" on Lincoln avenue, which would be the first motor bus line using overhead trolleys for power in operation in Milwaukee.

The electric company suggests trackless cars as a means of economy, obviating the expense of laying tracks and paving within the track zone. Property-owners are agreeable save on the point that the utility should be compelled to bear the cost of keeping the pavement in repair at all times, since the operation of these cars probably will cause much greater wear and tear than that produced by ordinary vehicular traffic on asphalt, even that of heavy motor trucks with trailers.

### SUGGEST FOREIGN SURVEY

San Jose, Cal., March 11.—Thirteen motor car dealers, members of the California Automobile State Assn., have recommended a survey of the used car situation in foreign countries. George Habermeyer of Bakersfield suggested that twenty-five or more dealers get together and send a man to some foreign country to make connections for the sale of used cars from the United States. Different methods of appraisal were discussed and it was brought out that the dealers of San Jose are considering the information of a used car corporation for the disposal of their stocks.

### RULES ON RUM RUNNERS

Columbus, Ohio, March 13.—Automobiles used for transporting liquor illegally may be sold under the orders of the court, whether they were driven by their owners or by some other person. This is the ruling of Judge Scarlett in dismissing a replevin suit brought by John Buell to obtain possession of a car seized by enforcement officers. Buell claimed that he had no knowledge that the car was used for that purpose.

### 1920 PACKARD SERIAL NUMBERS

The serial numbers of the Packard Single Six were omitted from the Passenger Car Serial Numbers published in the Feb. 2 issue. Below is given this information together with a revision of the Twin Six numbers:

Year	Model	Cyls.	Price	Serial Nos.
1920	Twin Six	12	\$5550	160130 up
	Number on left front leg of motor.			
1920	Single Six	6		U26 up
	Number on upper half of crankcase on right side.			



## California State Convention Refuses to Act as Salesman

### Denies Use of Headquarters as Sample Room—Endorses Control of Headlight Adjustments

(Continued from page 27)

cluded their leaving their respective establishments.

The Los Angeles Automobile Trade Assn. presented the following letter:

"Kindly advise us immediately whether we may send the following telegram to our senators and representatives at Washington:

Accessory Dealers' Division of this organization unanimously agree that, if bonus bill passes, a general sales tax be levied to raise the revenue, and that the stamp system of collection be adopted. Your careful consideration respectfully requested."

The state association replied to this letter, saying that the "telegram has merit, and undoubtedly will be instrumental in influencing our senators and representatives to cast their votes for the sales tax."

The work of the Commonwealth Club of California in undertaking an exhaustive survey of traffic conditions throughout the state was endorsed.

#### Opposed by Association

Announcement was made that the Farm Bureau Exchange, organized some two years ago by Merced and Stanislaus county farmers to market their products in a co-operative manner, and to buy their supplies in a similar manner, had been disbanded. The California Automobile Trade Assn. has been opposing these exchanges and similar co-operative schemes throughout the state.

Santa Rosa was selected as the place for the next meeting.

J. S. McCray, superintendent of the theft bureau of the Pacific Coast Automobile Underwriters' Conference, explained the manner in which the National Automobile Dealers' Assn. had fought high insurance as a resistance to sales and told of company losses on theft insurance.

A motion prevailed instructing the secretary of the California association, to send a letter to all members selling new or used cars, urging them to put a private identification mark, the character and location of which should be known only to the dealer, on every car handled for the purpose of future identification.

#### LIBERTY SALES ON BOOM

Detroit, March 13.—Liberty Motor Car Co., with a long string of orders piled up from the early 1922 shows, has entered upon a period of heavy production that will carry it through to early summer. The output for March will exceed that of any month in 1921 and the program for April calls for production and shipment of more cars than for any

month in the record-breaking year of 1920.

As an indication of the Liberty sales stimulus, the company declared that applications for retail sales rights were received from fifty-three dealers at the New York exhibit. Nine factory territorial men have been added to the staff to handle applications for unoccupied dealer territory.

Cliff Knoble has returned to his position as advertising manager of the company after an absence of several months. The company is going in for an extensive sales and advertising campaign which will be launched about April 1.

### January Production With Fords Reaches 90,486 Cars

New York, March 13.—Production of passenger cars and trucks in the United States for January aggregated 90,486, including Ford. The total for December was 78,995 and for November was 116,349. The relative gain over December for January by manufacturers excluding Ford was 40 per cent on passenger cars and 38½ per cent on trucks. Ford's relative gain for January over December was considerably below this figure.

There are no production figures for January 1921 with which to make comparisons but the output this year was much larger than for the same month last year. Most of the increase for January over the preceding month was in passenger cars ranging in price from \$500 to \$1250.

### 400 Daily Production of Ford Tractors Is Schedule

Detroit, March 13.—Ford Motor Co. will increase its tractor production to 400 daily in April, thereby doubling the present output. All parts of the country are represented in the increased business, the distribution being through the regular channels and in the usual quotas.

Production of cars and trucks is 34,000 ahead of production last year. January assembly at the plants approximated 40,000 against 30,000 January last; February with 52,649 compared with 30,305 last year.

#### CANCEL LOS ANGELES SHOW

Los Angeles, March 18.—There will be no automobile show in Los Angeles this spring. Instead, all energies will be devoted to making a success of Open Road week, which is scheduled for April. The directors of the dealers' association recommended a show in March, but lack of a suitable site was permitted to influence a decision in favor of indefinite postponement. Some dealers desired a tent show, but others were afraid to take a chance on the weather. The decision against a show did not meet with unanimous approval. Those dealers with new models were the strong advocates of the proposition.

## Timken Axle Co. Denies Affiliation with Others

### Has Not Combined with Parts Makers; Sales Agreements Not Financial Interests

Detroit, Mich.

Editor, MOTOR AGE:

Ordinarily we prefer to ignore rumors, but there have been so many persistent rumors recently concerning us and our connection with certain companies, which statements have made it appear that we are combining to enter into a warfare with certain companies, that we feel we must make a statement as to our position.

We are not in a combination with parts makers, either in the sale of units or servicing, nor are we in any combination with any automobile or truck manufacturer. We are in business to manufacture axles and sell them to anyone who is willing and able to buy and pay for them. It happens that for the purpose of serving the users of our product, we are selling parts to a number of parts stations who sell Continental and others, but that is purely an arrangement between us and the parts stations, and not a group arrangement between the unit makers.

#### Denies Joining Parts Makers

The statement that we have joined with a number of unit makers, and the Durant or Gray Motors is untrue. It is a fact that we are now selling axles to the Durant Motors Co. for their six cylinder cars, which is made at Muncie, and we should be very glad to continue this arrangement and increase our connection with the Durant Motors. This is purely a sales arrangement, and has no other object than the selling of our product to a company that is in the automobile business.

#### Feature Own Products

We are not so stupid as to attempt to attack any company in the automobile business, nor have we combined with any group in financing or promoting their business. We are confining our efforts, as we have in the past, to the manufacture of our own special product and selling it in a very legitimate way.

We feel we owe this statement to ourselves, to our customers, and to the trade in general. Briefly, our position is this—we are axle manufacturers. We own and control our business and consider every automobile and truck manufacturer as a possible customer. Every arrangement we have is a very simple contract for the sale of axles at a definite price, and our interest in the customer we sell is purely one of serving him as his unit maker.

Yours truly,  
A. R. DEMORY,  
President.

## Rubber Assn. of America Issues Warranty Bulletin

### Instructs 125,000 Dealers How to Make Adjustments Under New Sales Plan

NEW YORK, March 13—The Rubber Assn. of America has sent to approximately 125,000 dealers a poster on which is printed the standard tire warranty and claim form. Dealers are requested to display this poster prominently. With it the association has sent to each dealer a bulletin which says:

"The unsoundness of the former tire adjustment conditions is emphasized by the fact that clothing, footwear, household appliances and innumerable articles of utility (which are subject to service under conditions which the manufacturer cannot control or ascertain) are not sold with a definite guarantee of service and an unsound liberal adjustment policy. There is apparently no good reason why tires should be an exception. The abuse of the former condition in the tire industry tended to increase costs and the whole purpose of the present movement is to eliminate the economic waste.

#### Too Many "Policy" Adjustments

"Entirely too many of the adjustments formerly made were what the industry knows as "policy" adjustments. The dealer loses most by that kind of an adjustment because each tire thus furnished prevents a new sale by some dealer. It is no exaggeration to say that "policy" adjustments annually took millions of dollars from the pockets of the dealers alone.

"Under the standard warranty and claim form, only those tires which are faulty in material or workmanship will be considered for adjustment and then only upon the basis outlined in the second paragraph of the warranty. Tires cannot be adjusted, if run on wheels out of alignment, on snaky wheels or with lugs improperly tightened, causing unusual wear, or if damaged by either cuts, jabs, or stone bruises, or by underinflation or overloading.

"For the dealer, the new condition will eliminate much annoyance and loss of profit and it should remove all apprehension that some other dealer is going to do the thing that you know to be unsound and unbusinesslike. The consumer will benefit because formerly the careful user had to carry the burden created by the careless user. Now each user will pay his own way. If the tire is defective the owner can get fair treatment provided he makes a claim in the specified manner."

#### TABLET MARKS HAYNES START

Kokomo, Ind., March 14—As a result of the joint activity of the Hoosier State Automobile Association and the Kokomo Chamber of Commerce a historical tablet

has been erected on that stretch of the Pumpkin Vine Pike, three miles southwest of the city, where in 1894 Elwood Haynes made the first test of his automobile. The tablet designates the spot where Haynes and his companions started the car for the test. Haynes and several other well known men were present at the unveiling of the statute.

## Rolls-Royce Reduces Phaeton From \$14,900 to \$10,900

Springfield, Mass., March 13—A new price of \$10,900 for the Rolls-Royce phaeton, reduced from \$14,900, is announced by L. J. Belnap, president of Rolls-Royce of America. This price is guaranteed and represents a substantial economy to Rolls-Royce customers. In his announcement Belnap says that in the two years it has been on an operating basis, the company has determined its costs and perfected methods and organization in such a way as not only to equal but to excel the English built car. He adds:

"It is a fact that with the American mechanic, equally skilled as he is with the English mechanic, and excelling him as he does in enthusiasm and initiative, due to more favorable labor conditions, we are actually building the Rolls-Royce in America, not only better than it has ever been built before but more economically.

#### WONDERLICH ENTERS RACE

Indianapolis, March 14—Jerry Wonderlich, for three years a relief driver in Indianapolis 500-mile races, has his own mount for the 10th annual 500-mile International Sweepstakes event, May 30. Mrs. Mae Harvey, owner of one of the Frontenac fours which Louis Chevrolet built two years ago, has nominated Wonderlich to drive the car at Indianapolis. Both car and driver are now competing in the events on the various board speedways of the Pacific Coast.

#### GOODYEAR DEALERS CONVENTION

Ottumwa, Ia., March 14—General sales and inspirational conference of Goodyear tire dealers from all over southeastern Iowa will be held in the Hotel Ottumwa March 16. "Better Sales" will be the topic of business talks by factory heads during the afternoon meeting at which motion pictures of the Goodyear plant will be shown. F. S. Greisinger, head of the Des Moines sales branch, will preside.

#### OHIO SALES IMPROVE

Columbus, Ohio, March 14—A decided improvement in the demand for passenger cars in Columbus is reported by a majority of the dealers and distributors in this section. The improvement has been slow but steady since the annual automobile show early in February and is expected to continue.

## Country-Wide Reports Show Sales Increase Satisfactory

### Demand for Commercial Vehicles Growing Rapidly; the Low Priced Cars Lead

NEW YORK, March 14—Nearly 100 representative members of the National Automobile Chamber of Commerce who attended the meeting here recently were more enthusiastic than they have been for two years over the business outlook. Roy D. Chapin, president of the Hudson Motor Car Co., who presided, declared conditions were better than at any time since the depression began. He based this assertion upon reports from manufacturers and dealers all over the country.

These dealer reports were virtually unanimous in the statement that February business was materially better than January. One striking fact disclosed by the survey is that the situation in agricultural sections has improved. Even in the Dakotas the tone is much better. Only one of the many reports received described business as not so good.

Dealers used such adjectives as "good," "big," "bright" and "better," in describing the outlook for sales this month and next. This optimistic forecast was based on the belief that prices have been stabilized and that was the unanimous plea of the dealers.

Truck as well as passenger car sales have improved and the demand for commercial vehicles is growing steadily.

Sales of high-priced cars in the New York metropolitan district were 39 per cent larger in January than in January, 1921. Sales of low-priced cars were 25 per cent larger. Sales in the \$1,000 (wholesale) class doubled in January as compared with December and in the \$500 class they almost doubled. The greatest decrease in the January sales as compared with December was in the class above \$4,000 and in the \$1,500 class. Sales of one-half-ton and three-quarter-ton trucks more than doubled.

A report made to the members on the New York and Chicago shows disclosed that they were the most successful ever held from the standpoint of attendance. A return of 77 per cent of their footage costs was ordered for members who exhibited at the New York show and of 91 per cent to those who exhibited at Chicago. This was in addition to retaining \$25,000 in a trust fund for a show building. This fund will be used as a guarantee that a suitable exhibition place will be available in New York.

#### 55 CARS BURN AT BENTON

Benton, Ill., March 13—Fifty-five automobiles were destroyed March 7 in a fire which razed the L. C. Bayless garage. Loss will total \$75,000.



## Des Moines Show Scores With Big Sales as Result

### Farm Produce Prices Reach Higher Plane; Farmer Again Made Prospective Buyer

**D**ES MOINES, Iowa, March 15.—Gloom has disappeared in Iowa. If the thirteenth annual show of the Des Moines Automobile Dealers' Assn., held this week, did anything it crystallized the sentiment among the dealers of the state that the corner had been passed and that business has started on the upgrade.

Psychologically, the Des Moines show could not have been held at a better time this year than the week chosen. For the past thirty days has seen a wonderful recovery in Iowa among the farmers, and the farmer is by long odds the most important individual in the state as a business prospect.

During the past sixty days prices of farm products have shown a material advance.

Another proof of the fact that conditions have improved is that obligations of Iowa banks with the federal reserve banks have been decreased from a maximum of \$98,000,000 to \$62,000,000.

So with these facts in mind it is not hard to understand why the motor car dealers and distributors are looking brighter. They understand that there is still a long, hard pull ahead, but conditions are so much better with the farmer, and business in general has shown such a material improvement that they felt their feet are once more on solid ground.

Attendance at the Des Moines show, both from the public and dealers, is the largest in the history of the show. Paid admissions show an increase of 20 per cent over 1921 and Wednesday night saw the largest crowd which ever attended a Des Moines show. Dealer attendance is 100 per cent ahead of last year and many dealers brought prospects with them and closed deals on the ground.

Prospects have evidently decided that prices have become stabilized, and they are ready to buy. As evidence of this, witness the fact that a Des Moines distributor of a medium priced car sold at retail during the last two weeks twenty-

one cars, which is the equal of any period in the history of his business.

The Des Moines show this year was a brighter, snappier show than any of its predecessors. Managers of the show tried out the prize contests for salesmen and it produced the most courteous, snappy, efficient bunch of salesmen ever seen at a local show. A first prize of \$15 and a second prize of \$5 was offered each day to the salesman who made the most favorable impression upon an unknown prospect. These prospects, or critics, were men chosen from the automotive equipment representatives from outside of Des Moines and their finds were issued each day to the dealers in mimeograph form.

No trucks were shown this year on account of lack of room and the exhibition was confined exclusively to passenger cars and automotive equipment.

## Ohio Judge Holds Garage Is Responsible for Stored Car

Columbus, Ohio, March 14—In a recent court decision in Cleveland where the question at issue was the responsibility of a garage owner for cars stolen while in their keeping it is held that unless there is a special contract the garage owner is so liable.

As a bailee he is required to use the care of an ordinary prudent man under similar circumstances, and if the automobile stored with him is lost or stolen because of lack of such care he is liable to the owner unless he enters into a special contract to relieve himself of such responsibility or by making a leasing contract for a certain space in his garage for storage purposes, but in such event he must make it plain to the owner that the space is being leased and must draw the attention of the owner to all of the terms of the contract or leasing arrangement.

A garage owner is never liable without neglect or carelessness, except when he enters into a special insurance contract. However, when an automobile is stolen from a garage it is prima facie evidence that the garage owner is negligent and careless. Such evidence, however, can be rebutted by the garage man.

## 684 Tractor Users' Report Shows Majority Is Pleased

### The Work Done Better Than When Horses Are Used; Average 53 Work Days

**W**ASHINGTON, March 11—Analysis of reports received from 684 tractor owners in Alabama, Georgia, North Carolina, South Carolina and Tennessee shows that a preponderant majority are satisfied with the effectiveness of tractors and are using them to replace horses wherever possible. The division of agricultural engineering, department of agriculture, made this study to determine the views of tractor owners and estimate the possibility for sales.

All of the men whose reports were used in this study purchased their tractors between March, 1918, and September, 1920. The average first cost of the machine was \$1,050, and the average of life was 7.6 years. On this basis the annual depreciation charge is \$138 per year.

Each owner was asked the number of total days' work done per year with his tractor, and the average of the replies was 53 days. The two-plow tractors were used an average of 52 days per year and the three-plow tractors, 56 days.

About one-half of the men did some custom work with their machines, but over 90 per cent of the total work done by these tractors was on the home farm. They were used more for plowing than for any other one operation.

Over 90 per cent of these men stated that the quality of the plowing done with their tractors was better than that which they formerly did with horses or mules. The tractors drawing disk plows used on an average about three and one-half gallons of fuel per acre for plowing and those drawing mold board plows about three gallons per acre. This difference between the fuel required when using disk and mold-board plows is due largely to the fact that the disk plows are narrower than the mold-board plows, and the acreage covered per day is correspondingly less. The two-plow tractors used about 17 gallons of fuel per day

## Convention of Western Canadian Automotive



for plowing, and the three-plow tractors about 21 gallons per day.

The average cost (including charges for depreciation, interest, repairs, fuel and oil) per acre of using the two-plow tractors for plowing in 1920 was \$2.07, when using gasoline, and \$1.73 when using kerosene. For the three-plow tractors it was \$1.90, when using gasoline, and \$1.59 when using kerosene. These costs are based on 31 cent gasoline, 20 cent kerosene and 85 cent lubricating oil, the average prices which these farmers paid during 1920. The repair costs were computed on the basis of an annual repair charge of 4 per cent of the first cost of the machines, and interest was charged at 8 per cent on the average investment. On account of the smaller acreage covered per day and the greater amount of fuel used per acre, the cost of plowing with the disk plows was somewhat greater than was the cost when using mold-board plows.

Each class had owned their machines about one and one-half years but the repair costs of the satisfied owners had been only \$33, while those of the dissatisfied owners had been \$170. The tractors which were proving satisfactory had been out of commission when needed an average of two days during the year preceding the time of reporting, while those which were proving satisfactory had been out of commission 14 days.

A comparison of the reports of the men who were satisfied with their tractors with those who were dissatisfied, showed that in some cases the failure to take advantage of the opportunity offered by the tractors to increase the acreage and reduce the work stock was probably responsible for the dissatisfaction, in other cases the poor service rendered by the tractor was responsible, and experience has shown nearly one-half of the dissatisfied owners that their present tractors are not the proper size for their farms.

#### N. A. C. C. ENTERTAINS McDONALD

New York, March 15—Thomas McDonald, chief of the Bureau of Public Roads, was the guest of honor at a dinner given by the Highways Committee of the National Automobile Chamber of Commerce at the Hotel Ambassador. Most of the guests were representatives of

newspapers, trade and business papers. The purpose of the meeting was to discuss the present status of highways in the United States and to enlist wide spread cooperation in highway construction and maintenance work which will be carried on in the next few years. Edward F. Jordan, president of the Jordan Motor Co., presided. George M. Graham, sales manager of the Peerless Motor Car Co., emphasized the essential character of motor vehicles.

### Transportation and Communications

WASHINGTON, March 14 — The time is not far distant when motor vehicle transportation will be universally recognized, in the opinion of Will H. Hays, postmaster general. His belief is expressed in the following statement:

"A little while ago I read an article by H. G. Wells that I wish might be read by every business man; in fact it could be read with advantage in every school house in America. Wells traced the development of civilization to two factors, transportation and communication. These have been the vital factors that have enabled human beings to develop so marvelously and so rapidly in the last few hundred years.

"The Post Office Department is the government department of communications. We are all glad and proud to be associated with one of the vital factors in civilization. But we also touch upon transportation, and I look forward to a time not far distant when motor vehicle transportation will be universally recognized as one of the vital factors in the development of civilization."

#### TO FIGHT STATE'S CLAIM

Toledo, March 13—Receivers for the Willys Corp. have asked Judge Killits here for authority to combat the state of Ohio on the matter of an annual assessment against the corporation which, they allege, is levied and collected under a statute that is unconstitutional.

The claim of the state against the company is for \$89,556.40.

### Republic Motor Truck Co. Is Reorganized with Willys Out

Frank E. Smith New President; Executive Offices Moved from New York to Alma

NEW YORK, March 13—Complete reorganization of the Republic Motor Truck Co., Inc., has followed the resignation of John N. Willys as president, and the election of Frank E. Smith as his successor. Other resignations included those of H. I. Shepherd as treasurer and Walter P. Chrysler and James E. Kepperley as directors. Shepherd will continue temporarily as a director as will W. J. Baxter and E. C. King.

New directors elected to fill the vacancies were: O. W. Hayes, vice president in charge of engineering, purchasing and production; H. D. Minich, vice president in charge of finance and accounting, and Charles G. Rhodes, secretary.

It is understood that there has not been, up to this time, any change in the stock control of the company which has been held jointly by Willys, Baxter and Burt but this is forecast by a statement of the company that "these changes bring back to the west control which was transferred to New York at the time Willys and his associates purchased the stock of the company."

The executive offices of the company have been removed to Alma, Mich., where the plant is located. It is understood that Shepherd will join the organization of one of the large Cleveland banks.

Michigan and Illinois bankers are taking an important part in the affairs of the Republic. As soon as the banks can obtain control of all the notes on which the company defaulted the new money necessary for working capital will be provided. The company now has current assets of \$4,600,000 after taking a loss of \$1,000,000 on its inventory. While truck sales were light last year the company made a large profit on parts replacement business. With the improvement in the truck market and with the readjustment of finances, it is confidently expected the company will be able to move ahead on a substantial basis.

### Equipment Dealers, Winnipeg, February, 1922





## CONCERNING MEN YOU KNOW

Edgar T. Glass, New Britain, Conn., for several years past sales manager of the tractor division of the New Britain Machine Co., has resigned, and, according to President Herbert H. Pease, of the corporation, has "other things in view."

George W. Moore, 73, for more than 15 years proprietor of the George W. Moore & Son, trucking and furniture moving business, Bridgeport, Conn., died at his home here, following an illness of two months.

John Dew, Jacksonville, Ill., has been appointed manager of the Chain Tire Store, opened on March 1, by the World Tire Store Corp.

Byron F. Smith, Springfield, Ill., has opened a tire, oil and accessory store for motor vehicles.

G. Vernon Beck, late of Decatur, Ill., and for many years prominent in the automotive industry of central Illinois, has been appointed sales manager for the Bruce Automobile Co., Springfield, Ill.

Rollo Kennedy and Frank Weeks, Trenton, Ill., have opened a garage and will specialize in repair and storage.

L. G. Peed, Toledo, Ohio, for more than a year manager of the Willys-Overland, Inc., has been named assistant sales manager by A. C. Barber. R. L. Butler, zone supervisor for Iowa, Nebraska and Missouri, will succeed Peed at the local branch. W. O. Kiracofe, formerly sales manager of the Banting Mfg. Co. here, has been named retail sales manager to succeed L. J. McCracken, who will have charge of the Pacific coast territory for Willys-Overland.

C. C. Hollenbeck, sales manager of the Pomroy-Bray Motor Sales Co., Chicago, Ford dealers, reports that the actual sales for the last month were far in excess of what was expected and that March sales, in two weeks passed the quota they had placed for the entire month.

L. J. McCracken, sales manager of the Toledo branch of the Willys-Overland Co., has been appointed acting manager of the Los Angeles branch, one of the most important properties in the entire Willys-Overland branch organization.

Harry G. Sparks, sales manager of the automotive equipment division of the Sparks-Withington Co., Jackson, Mich., spoke to 800 students of the Michigan State Auto School, on "Motor Horns—How to Sell and Service Them." The Sparks-Withington film, "Tooting Your Own Horn," which is a supplement to the Automotive Equipment association "Ask 'Em to Buy" film was run.

R. G. Craig has been named manager of the New York branch of the Dort Motor Car Co., succeeding F. L. Sanford, who resigned to join the Dodge New York organization. Craig was formerly Dort manager of sales at the New York branch.

J. M. Mather, late Pacific northwest territorial manager for the White Service company of Cleveland, announces that the company will open a sales branch and service station at Spokane under his management.

B. L. Cook, of the J. I. Case Threshing Machine Co., has been elected president of the Spokane Tractor association. E. W. Hill, of the Cleveland Tractor Co., was elected vice president, and A. S. Fetterman, of the Spokane Mfg. Co., secretary-treasurer. P. McGovern, the retiring president, and George H. Summers were elected to the board of trustees.

John M. Lund, 58, for many years proprietor of a livery stable on the site where he has for some years past conducted a leading garage and service station, died this week.

Hamilton W. Jones, general manager of the Hartford, Conn., branch of the New York Motors Corp., has resigned to enter the export field with which he was most actively identified in South Africa for several years. His successor has not been announced.

Eisle A. Pierson, service manager of the Mack Motor Truck Co., Hartford, Conn., and president of the Automotive Service Assn. of Hartford county, has resigned to accept a similar berth with the City Auto Repair Co., Hartford, Conn.

Fred J. Wood has resigned as service manager of the City Auto Repair Co., Hartford, Conn., and has acquired the majority holdings in the Salisbury Service Station.

C. C. Adams and Henry Krantz, Dover, Ohio, have been named receivers for the Tuscora Rubber Co., a \$1,500,000 company making special rubber articles at this place. The corporation was organized in 1919 and started operations in 1921. There are approximately 1600 stockholders over Ohio and West Virginia.

Northern Wheel Co., Alma, directors have elected Frank W. Ruggles, president of the company for the coming year. A. C. Chapman was named vice president and general manager; J. W. Blakeley, vice president; Orville Allen, secretary; Charles O. Ward, treasurer.

Jeremiah O'Herron, Avon, Ill., has sold his interests in the Avon Motor Car Co. to Fred Fahner, who will operate the plant alone, distributing the Ford car. O'Herron will operate a battery service station.

T. J. Noblett has been appointed distributor of the Jordan car at Springfield, Ill., and has opened a sales agency.

M. B. Hoagland, president of the Signal Truck Corp., Detroit, has appointed Earle T. Sutton to the factory staff.

William M. Sweet has resigned as a director of the Bearings Service Co., New York, and will be succeeded by A. C. Hitchcock, sales manager of the New Departure Mfg. Co., one of the concerns for which the Bearings company acts as a service department. William A. Brooks also has resigned as secretary of the Bearings company and has been succeeded by W. J. Onge, sales manager of the company.

William E. Betts has been appointed advertising manager of the Studebaker Corp. of America, South Bend, Ind.

Frank Miller, president of the West Side Buick Co., Chicago, is in Houston, Texas.

Walter C. Lyons, New Haven, Conn., president of the Packard Sales and Service Co., was killed and John M. Curtis, his service manager, and Wilfred L. Aubry, a chauffeur, were badly hurt when a car in which they were riding hit a telegraph pole in the outskirts of the city and turned turtle in a field 200 feet distant. Lyons was dead when help reached the scene.

Fred C. Ruch has been succeeded as secretary of the Auto Body Co., Lansing, Mich., by John W. Haarer, cashier of the City National Bank. J. Edward Roe, president of the American State Savings Bank was named treasurer. F. N. Arbaugh continues as president, Harris E. Thomas, vice president; W. V. C. Jackson, vice president and general manager. Ruch continues as a director. Other directors in addition to the officers are E. S. Porter, A. C. Stebbins, C. E. Bement and Richard Price.

H. C. Smith, who has just resigned from engineering work in the aviation department of the government for some four years, has been appointed district sales supervisor for Earl Motors, Inc., with headquarters at Evansville, Ind.

operations to the phaeton for the first few months and will start the sedan about May 1. The other models, roadster and coupe, will be added later. The phaeton is priced at \$1,065 and the sedan at \$1,395. Prices on the other models have not been fixed.

Manufacturing of the Jewett line will be carried on at the Paige factories. Two new assembly tracks will be laid out for the Jewett line. There is sufficient room at the factory for both Paige and Jewett production in 1922, according to factory engineers.

## Wilson of Maxwell Says Car Is No Longer Sold by Phone

### Declares Harder Selling Is for Good of Entire Industry—Public Critical

DETROIT, Mich., March 13—The process of deflation has gone farther in the automotive industry than in any other, in the opinion of William Robert Wilson, president of the Maxwell Motor Corp. Discussing the general situation in the industry, he said:

"The automobile manufacturer realizes that competition is keener than ever, that there must be no doubt about his product, but that the good car, correctly priced, need have little fear of a satiated market. Also, that conservative marketing and expert fingers on the pulse of demand will establish the automobile business on a more stable basis than ever.

"The automobile dealer is of his own wise, converted to a firmly conservative business policy. He knows that the day of the telephone order is gone for good—for the good of all concerned. He is in a frame of mind amicable to present conditions. He knows that he must go after business and is fully aware that the offer of real service is a genuine sales need. He is prepared to follow these dictates for on them his 1922 success is assured.

"I believe the public is more deeply interested in the automobile than ever, but more critical. It is selecting cars more carefully and is more insistent on quality as evidenced by the New York and Chicago shows. The New York show drew record attendance, but not record sales, yet those manufacturers who offered a product of evident value found an agreeable amount of business."

### GRAY PLANS UNCHANGED

Detroit, March 14—President Frank L. Klingensmith, of the Gray Motors Corp., says that the plans of that company will not be changed in any way by the production of a \$348 car by W. C. Durant. Practically all the equipment for the manufacture of the Gray car is now ready and it is expected shipments will start about April 10. The price will be announced before that time.

"There is room for a number of manufacturers in the low priced field," Klingensmith said, "and we are looking for about 10 per cent of the business."

### PIERCE-ARROW TAKES LOSS

New York, March 15—A total loss of \$8,763,712 for the year 1921 is reported by the Pierce-Arrow Motor Car Co. after all interest charges, depreciation, inventory adjustments and operating expenses. As a result the balance sheet on Dec. 31, 1921, showed a profit and loss depreciation of \$4,422,165 against a profit and loss surplus of \$4,541,646 at the end of the previous year.

## Jewett Production Schedule Calls for 500 Cars in March

Detroit, March 14—Jewett Motors will get into production March 10 on its phaeton car model and will build about 500 cars the first month. This schedule will be increased to about 1,800 in April and will continue at that point until July 1, by which time 6,000 cars will be completed. A new schedule will be laid out at that time.

The company will confine its building

## IN THE RETAIL FIELD

Elvers & Rhode Co., Madison, Wis., is a new \$15,000 corporation, formed by A. Rhode, H. E. Elvers and others to deal in automotive accessories of all descriptions.

O. E. Clymer, Amery, Wis., has sold his interest in the Fay Auto Co. to E. M. Fay and A. W. Hughes and will move to Bloomer, Wis., to accept the Ford dealership.

Salem Avenue Garage, Kenosha, Wis., is a voluntary bankrupt. It schedules assets of \$9,884 and admits liabilities of \$16,777.

Madison Chandler Co., Madison, Wis., has been incorporated with \$10,000 capital to buy and sell motor cars, automotive equipment, etc. The incorporators are W. L. Osgood, Frank Weger and Marion Osgood, all of Madison.

Fedthofer Bros., of Valmy, near Sturgeon Bay, Wis., suffered a loss of \$18,000 by fire which destroyed the garage and repairshop. A new fireproof building will be erected at once.

Fritz & Wells, Park Falls, Wis., are building a new public garage and service station, 51 x 70 ft., two floors, to be ready April 1.

Charles Ceaff, Shiocton, Wis., has let contracts for the erection of a public garage and repairshop, 40 x 80 ft., estimated to cost \$15,000 equipped. Ed Moran & Sons, Madison, Wis., have opened a tire and accessories store. It will operate under the franchise of the World Tire Corp. group of 600 retail stores.

Vesta Battery dealers in the Wapello County (Iowa) Motor Trades bureau district, made dealers' day a gala day for their numbers. They attended the show in a body, had lunch at the Commercial club and heard an address by H. W. Ridgen of the Vesta Corporation.

U. M. Lange and C. S. Tscherner, Dubuque, Iowa, have purchased the Peter Even & Son auto agency and will continue the business in the same location. They have added Reo and Federal trucks to their dealers' lines. Joseph Even, of the retiring firm, will devote his entire time to the Ford agency.

Simmons Motor Car Co., Chicago, distributors of Grant, moved their headquarters last month.

Wire Wheel Corp., Chicago, has moved to larger quarters.

H. T. Webber, late of Aurora, Ill., will open a tire and accessory store at Galesburg, Ill., in the near future. It will be known as the Speed Tire Shop.

James M. David, Rock Island, Ill., who has been conducting a tire and vulcanizing shop for several years, has filed a voluntary petition in bankruptcy. He listed liabilities of \$2,737 and assets of \$1,621.

R. W. Rank, Moline, Ill., is preparing plans for a \$10,000 garage and auto display room. Drew Donaldson, Rock Island dealer, will occupy the building.

Christie Thomas Auto Sales Co., Greencastle, Ind., has installed a radio telephone and amplifier in its sales rooms as an advertising feature. From the many visitors the company is adding many prospective purchasers.

The Ford Agency, Spartanburg, S. C., has been taken over by Ernest Burwell, of Charlotte, N. C. Dr. Elwood F. Bell, in charge of the Ford Spartanburg agency until March 1, is now with the Bell-Brown Motors Co., handling the Oldsmobile.

F. H. Brusky, St. Paul, has obtained the St. Paul agency for Haynes cars. Brusky plans to handle the Haynes in addition to the Davis cars, which agency he now holds.

M. S. Charlton, Ft. Wayne, Ind., formerly assistant advertising manager of the Peerless Motor Car Co., has joined the organization of C. H. Kines, local Peerless dealer.

Dean Motor Co., Moline, Ill., has made an enlargement by which a repair shop is added to the plant.

Constant & Groves, Springfield, Ill., have been appointed distributor for the Chandler car in the Sangamon county territory.

A. G. Medlicott has been appointed manager of the Springfield (Mass.), branch of the Packard Motor Car Co., to succeed V. A. Guyer, who resigned to become manager of the New Jersey division of the York Motors Corp., Lincoln distributors. Mr. Medlicott was for some time at the Packard factory and more recently was connected with the company's New York office.

Florence Garage, Inc., has been chosen by the Springfield Durant Co. to handle Durant cars in Northampton, Mass., and has begun the erection of a new building to be ready for use in May.

Ralph T. Pierce, for 10 years with the Donovan Motor Car Co., Boston, has been appointed service manager for the F. G. Parker Co., Studebaker distributors in Springfield, Mass.

Oakland Agency of North Adams, Mass., is about to open a branch in Pittsfield, with J. B. Lyster in charge.

G. A. Ashton Co., St. Paul, Minn., large dealer in accessories, has opened a new place of business. This company handles all leading motor car accessories as manufacturers' agent.

Wolf & Wright, Lena, Ill., have opened a modern garage, dedicating it with a public reception that attracted several thousand persons. Hand-some souvenirs were given away.

1920. The total for 1921 was \$304,487,243 as against \$567,320,603 in 1920.

The net earnings of the class A units were \$29,671,494 while there were losses of \$16,431,547 on the class B units, leaving net earnings from operations as a whole of \$13,239,946. From these earnings were deducted interest of \$5,281,084 on notes payable and \$2,174,080 for the employees' investment fund leaving a net income after ordinary charges of \$5,784,782.

Charges for extraordinary losses and adjustments were: write down of inventories Dec. 31, 1921, to cost or market, whichever was lower, \$16,603,073; provision for refunds due dealers and distributors on account of price reduction effective Jan. 1, 1922, \$2,441,376; cost of cancellation of commitments, rebates on sales in 1920 account of price guarantees and other miscellaneous losses charged off in 1921, \$11,421,102; special reserve established Dec. 31, 1921, to cover anticipated losses and unforeseen contingencies pertaining to 1921 or prior years but not at present definitely ascertainable, \$14,000,000, making a total of \$44,465,552.

A condensed comparative consolidated balance sheet as of Dec. 31, 1921, and 1920 is shown below.

### DEALERS TO REORGANIZE

Wilmington, Del., March 15—A meeting of the stockholders of the Wilmington Automobile Co., the largest motor concern in the city, has been called for March 13 to act upon a resolution passed by the directors on Feb. 21, proposing dissolution of the company. The purpose, it is understood, is to reorganize along broader lines. Heretofore the company, of which F. B. Norman is the head, has handled General Motors lines. It is proposed to take on others also, and the name will be changed to the Wilmington Auto Co.

### KOKOMO SHOW

Kokomo, March 14—Surprising crowds taxed the capacity of the automobile show this week. It is the first show staged in Kokomo on a big scale. More than 28 exhibits make up the show, for which a local dealer's building was loaned.

## GMC 1921 Sales Fall Off \$262,833,360 Against 1920

**Net Earnings From Operations Were  
\$13,239,946; Losses for Year  
Total \$44,465,551**

**NEW YORK, March 13**—A preliminary report of the General Motors Corp. for the calendar year 1921 shows a net income after ordinary charges of \$5,784,782 but after charges for extraordinary losses and adjustments aggregating \$44,465,552, there remained a balance of \$38,680,770 to be charged against surplus.

A statement by Pierre du Pont says that a statement of 1921 earnings would be misleading if attention were not called to the losses and adjustments in units undergoing liquidation and reorganization. To make this situation clear, he divides operation of 1921 into two classes, one of which includes the divisions thoroughly established and whose products is so standardized that it does not require readjustment. The

other class includes divisions undergoing reorganization and rearrangement including some cases of complete abandonment and liquidation.

Net sales in 1921 for the class A, or thoroughly organized units of the corporation were \$225,261,110 as compared with \$370,288,235 in 1920. The net sales of the class B units, or those undergoing reorganization last year, were \$79,226,133 as compared with \$197,032,368 in

## Summary of GMC Annual Statement

### CURRENT ASSETS

	Dec. 31, 1921	Dec. 31, 1920
Cash in banks and on hand.....	\$ 40,057,401.53	\$ 47,332,842.21
United States Government bonds.....	5,228.04	41,262.21
Marketable securities.....	27,009.31	34,096.31
Sight drafts against B/L attached and C. O. D.....	4,677,241.39	9,667,580.59
Notes receivable.....	4,794,978.99	13,449,376.90
Accounts receivable and trade acceptances, customers and others.....	18,944,844.09	22,233,886.80
Inventories at cost or market, whichever is lower.....	108,762,625.35	164,684,678.72
Prepaid expenses.....	1,944,988.35	1,891,854.06
<b>Total current assets.....</b>	<b>\$179,214,317.05</b>	<b>\$259,335,577.80</b>

### CURRENT LIABILITIES

Accounts payable (and trade acceptances in 1920).....	\$ 15,640,429.41	\$ 27,160,681.23
Notes payable.....	48,974,996.29	72,421,451.45
Taxes, payrolls and sundries accrued not due.....	15,894,778.40	14,101,794.90
Accrued dividends on Preferred and Debenture stock, payable February 1.....	1,043,763.07	1,018,943.73
<b>Total current liabilities.....</b>	<b>\$ 81,553,967.17</b>	<b>\$114,702,871.31</b>



### SHALER COMPANY TO REBUILD

Waupun, Wis., March 13.—Arrangements to build a new plant on a scale exceeding that of the one totally destroyed by fire March 3 are being made by the C. A. Shaler Co. of Waupun, Wis., manufacturing vulcanizers, tire and rubber repair equipment, headlight lenses and other automotive specialties. Although the loss was a heavy one, only a part of the damage of \$300,000 to \$350,000 being covered by insurance, the industry will engage immediately in the rehabilitation of its productive facilities. C. A. Shaler, founder and president of the company, was in California at the time of the fire, and upon being apprised of the details, wired instructions to R. B. Dunlap, secretary and sales manager, to proceed with reconstruction as early as possible. The Shaler company carries a large amount of business on its books and new business has been developing at a most satisfactory rate for the last few months, keeping the factory fully occupied, with overtime schedules in effect in some departments.

### SERVICE TRUCK PRODUCTION

Wabash, Ind., March 14.—Production on the new model Service truck, begun February 15 on a four-a-day basis, has been maintained and the steady addition of men to the working force is rapidly completing arrangements for production on the \$3,500,000 order for the Polish government. None of this goods has yet been turned out.

Sale of a considerable quantity of gold notes, in America, to Polish families, being organized by a syndicate of Polish bankers which underwrote the order for several million dollars' worth of Service truck equipment.

### ASHLAND DEALERS ORGANIZE

Ashland, Wis., March 13.—The Ashland (Wis.) Automotive Dealers' Assn. has been organized with a membership of 12 for mutual progress and protection, and becomes affiliated with the Wisconsin Automotive Dealers' Assn. Joseph Brown, Ford dealer, was elected president; Louis Filiatrault, of the Ashland Motor Service Co., secretary, and George White, of the Milavetz & White Garage, treasurer.

### TIRE DEALERS ORGANIZE

LaCrosse, Wis., March 13.—Tire dealers of LaCrosse, Wis., one of the principal cities in western Wisconsin, have come together. The new organization is known as the LaCrosse Tire Dealers' Assn., and its officers are: President, John L. Ash; vice president, H. H. Lehman; secretary and treasurer, B. M. Count.

### DALLAS DEALERS REPORT SALES

Dallas, Texas, March 15.—The third month of the year started off with a rush so far as actual retail automobile sales were concerned. The first week of March set a new record for sales by the Dallas dealers, except of course the week

of the automobile show. It was said by a half dozen dealers that the retail sales for the first week of the month were 15 per cent above those of the first week of February or those of January.

### BUDD WHEEL INCREASES SERVICE

Philadelphia, March 10.—The Budd Wheel Co., which now has more than 50 service stations located with well established wheel dealers and repairmen in the larger cities of the United States and Canada, is steadily expanding its service system. All of these stations are carrying spare parts for both wire and disk wheels in addition to an assortment of wheel parts and equipment. The service stations also are prepared to make repairs on wheels and they soon will be provided with apparatus for straightening disk wheels. Inasmuch as the Budd-Michelin disk is manufactured to the same dimensions as the Michelin wheel in Europe, it is possible for these stations to equip imported cars.

### RAILWAY FAVORS TRUCKS

Baltimore, March 10.—The Merchants' & Manufacturers' Assn. has been informed by the Pennsylvania Railroad of a plan for motor truck distribution of freight is under consideration for this city. It is the belief of Robert C. Wright, general traffic manager of the Pennsylvania, that the vast volume of less than carload traffic congests the rails of the terminals and interferes with the proper handling of carload traffic. For that reason, he believes it should be eliminated entirely from important stations and provided for by the construction of a large warehouse on the outskirts of the city from which store-door deliveries would be made by motor truck at the expense of the railroad.

### PAGEANT SHOW THIS SUMMER

Chicago, March 10.—At a dinner given by the Hotel Assn. in the La Salle hotel March 7, Mayor Thompson outlined his plans for the second Pageant of Progress exposition to be held on the Municipal pier the latter part of July. John Dill Robertson, former health commissioner, will be in charge of all arrangements. This pageant presents an opportunity for automobile dealers to display their cars in midsummer to people attending from all parts of the country. Last year the attendance was approximately 1,000,000.

### OTTUMWA SHOW SUCCESS

Ottumwa, Iowa, March 13.—Third annual automobile show of the Wapello County Motor Trades Bureau, which has just closed, proved highly successful not only from point of attendance but from floor sales. Dealers reported encouraging business and bright lists of prospective buyers. Frank Lynch, manager of the show, claimed that it had established a record for southeastern Iowa in the face of discouraging financial atmosphere.

### INTERMOUNTAIN OFFICIALS

Salt Lake City, Utah, March 10.—Frank Botterill, president and general manager of the Botterill Automobile Co., this city, was chosen president of the Intermountain Automotive Trades Assn. at its annual meeting.

Botterill succeeds Russell Richards, of the Hyland Motor Car Co., Salt Lake City, who served as president for two terms, the first two years of the association's existence. Carl L. Snow, this city, was elected secretary-manager in place of Charles C. Backes, who has resigned. V. A. Culver, sales manager of the Motor Mercantile Co., was elected treasurer. Lewis P. Haines, vice president, is manager and treasurer of the Ogden Motor Car Co.

The show this year was the most successful in the history of the movement locally. About 50,000 persons were in attendance and unusual interest and enthusiasm were shown by the visitors.

### PRESENT BRONZE TO LELAND

Detroit, March 10.—A miniature replica in bronze of the St. Gauden's Lincoln, standing about three feet in height, was presented to Henry M. Leland on his 79th birthday in February by the 10 original Lincoln distributors. The occasion of the presentation was made one of general participation by all employees and dealers, the former contributing a huge cake to the ceremonies and the latter a bouquet of 79 American Beauty roses. There was a general reception in which speeches were made by Henry M. Leland and other officers. Henry and Edsel Ford attended.

The distributors who sponsored the gift of the statue, and whose names are inscribed on a tablet commemorating the occasion, are H. M. Allison, M. J. Budlong, J. M. Fitzgerald, O. C. Funderburk, J. H. Lifsey, R. P. McCurdy, J. C. McNiece, W. M. Murphy, C. P. Stephens and James Sweeten, Jr.

### EVANSVILLE SHOW

Evansville, Ind., March 14.—Attendance at the annual show of motor cars, conducted in the Memorial coliseum by the Evansville Automobile Dealers' Club this week, exceeded expectations. Definite announcement was not made, but reports are that actual sales were quite satisfactory to the exhibitors.

### CLETRAC PRICE REDUCED

Cleveland, March 13.—The Cleveland Tractor Co. has reduced the price of Model F Cletrac from \$795 to \$595. The new price is effective immediately and furnishes the tractor complete.

### WINDSHIELD CLEANER REDUCED

Cleveland, March 13.—The Folberth automatic windshield cleaner price has been reduced from \$10 to \$7. It is made by the Folberth Auto Specialty Co.

## BUSINESS NOTES

Karl Brothers, Fairfield, Conn., dealers in motor vehicles, has been incorporated, according to papers filed with the secretary of state, with an authorized capital stock of \$50,000. The incorporators are John M. Karl, Stephen E. Karl, Joseph A. Karl and Leo E. Karl, all of Fairfield.

Bluffton-Huntington Buick Co., Bluffton, Ind., entertained factory branch officials and executives of Buick stores in nearby counties at dinner recently. Thirty were present. Improved business in this part of the state was generally reported.

Sioux Falls Automobile Association has been formed, with \$5000 capital. The incorporators are G. C. Redfield, D. L. McKinney and John P. Bleeg. The next automobile and industrial show will be April 5-8 in the Coliseum.

Heiss Tire Co., Sioux Falls, has been incorporated with an authorization of \$100,000 capital by accessory men, H. F. Brownell, M. C. Heiss and H. H. Brownell.

Willys-Overland Co., Minot, N. D., will open a factory branch here, to serve the territory west to the mountains. L. C. Stearns is named branch manager.

George W. Nock Co., Philadelphia, has been appointed distributor for "Instant-Pep-Co." piston rings.

Kearns-Dughie Motor Corp., Danville, Pa., has announced new prices for its different truck models.

R. M. Kaough & Co., Ft. Wayne, Ind., automotive jobbers, have begun remodeling operations on a building adjoining their present quarters.

Federal Rubber Co., Philadelphia, manufacturer of Federal tires, has opened a distributing warehouse to serve this city and adjacent territory which will not depend, as heretofore, upon New York and Richmond as distributing centers.

George B. Tillinghast, owner of a garage at Buffalo, will erect a \$50,000 addition to his service station this spring, giving the building a storage capacity of 225 automobiles and making it one of the largest in Buffalo.

McCord-Harris Co., Columbus, Ohio, central Ohio distributors for the Chandler and Cleveland, has moved from its old location to larger quarters. Under the new arrangement the service department is located with the sales rooms.

Glenn W. Tisdale, president of the Automobile Merchants' association of New York, was the principal speaker at the March meeting of the Automotive Service association of New York.

Empire Sales Co., Bridgeport, Conn., a new local concern for the manufacturing of automotive accessories, has recently been incorporated to handle hub caps, tire valve cores and cylinder priming pet cocks. The concern will handle the sales end, production of the orders being left to the Grant Mfg. & Machine Co., of this city.

Brill-Saunders Machinery Co. has been incorporated at Appleton, Wis., with \$150,000 capital to manufacture and deal in all kinds of machinery, tools, etc. The incorporators are Sam R. Saunders, Edward Brill and Walter Blake, all of Appleton.

Seamweld Equipment Co., Milwaukee, Wis., has changed its corporate title to the Fred Pabst So.

Atlas Drop Forge Co., Lansing, Mich., paid a 50 per cent stock dividend and a 25 per cent cash dividend in February, the dividend being in reality the distribution of a surplus which has been accumulating over a period of eight to 10 years. The dividend action is taken as an indication of assured business conditions for many months to come.

Motor Truck Service Co., Milwaukee, which recently has become state distributor of the Columbia Six, has changed its corporate title to The Columbia-Wisconsin Co.

Parenti Motors Corp., of Buffalo, N. Y., has opened a factory branch at Philadelphia. W. E. Raymond, general sales manager, is located here for the present and L. J. Carry, in charge of the Philadelphia headquarters, will be here permanently. Branches and dealers are to be established throughout eastern Pennsylvania, New Jersey, Delaware and Maryland, with Philadelphia as the distributing point.

Auto Parts Co., Peoria, Ill., has broken ground for a new building, to cost \$18,000. Expanding business has made necessary a new and larger plant. It will be ready for occupancy May 1.

Davis Headlight Co., Virden, Ill., organized one year ago for the manufacture of a new type of headlight for motor vehicles, and with a capital stock of \$10,000, has dissolved and the charter has been surrendered. E. G. Gordon was president and E. R. Riedle secretary. Too much competition and difficulty in interesting manufacturers of cars led to the decision to dissolve the corporation.

World Tire Stores Corp., which is now opening a chain of stores in central Illinois, has selected El Paso, Wenona and Mazon, for such branches.

Batavia Rubber Co., Batavia, N. Y., tire manufacturers, will open a chain of retail stores through which it will distribute its output, according to an official announcement of Ernest W. Kling, general manager of the company. The first stores will be opened in Batavia and Lockport, N. Y.

Fedders Mfg. Co., Buffalo, purchased the former Lautz Marble Works plant in Bridgeburg, Ont. The plant will be refitted and radiators will be manufactured there.

Adria Motor Car Co., Batavia, N. Y., announces that it has met the demands of its creditors and has resumed production after a month's suspension.

C. H. Wills & Co., Marysville, Mich., has appointed six new distributing organizations and a considerable number of new dealers for Wills Sainte Claire motor cars.

Henry A. Poppert & Sons, brass and aluminum founders, and H. A. Poppert & Co., pattern-makers, occupying joint quarters in Milwaukee, have been incorporated under the name of Henry A. Poppert & Son Co., with a capital stock of \$50,000. The incorporators are Henry A. Poppert and Russell L. Poppert and Jacob J. Poppert.

C. W. Dickover Mfg. Co. has been incorporated at Tomah, Wis., to manufacture garages and repairshop equipment of all descriptions. The capital stock is \$25,000 and the incorporators are Charles W. Dickover, Alex M. Henry and Earl W. Henry, all of Tomah.

Cooper Auto Sales Co., Middleport, Ohio, has been chartered with a capital of \$50,000 to deal in automobiles, trucks and supplies. Incorporators are R. V. Ebersbach, Frederick Ebersbach, H. E. Cooper, Edna B. Cooper and Mildred Ebersbach.

Cleveland Hammered Piston Ring Co., Cleveland, Ohio, has been incorporated with a capital of \$110,000 to manufacture piston rings and other auto parts. Incorporators are Henry F. Gray, R. A. Gillie, Agnes Kent Strong, Corrine Allshouse and Ralph W. Edwards.

Motor Parts Machine Co., Cincinnati, Ohio, has been chartered with a capital of \$25,000 to manufacture parts for passenger cars and trucks. The incorporators are Raymond E. Wood, H. S. Elliott, Ruth Wood, Chester R. Shook and Rolland L. Kraw.

Bingham Mfg. Co., Columbus, Ohio, has been incorporated with a capital of \$100,000 to manufacture special parts for trucks and to assemble trucks. The company has taken over the plant of the Immel Co., large body makers, which went into the hands of receivers some time ago. H. N. Bingham is president and general manager; F. E. Kocher, vice president, and G. P. Hinkle, secretary. Other incorporators are J. A. Shearer and James R. Spellman.

Woodland Tractor Co., Columbus, Ohio, is the name of a new company, chartered with a capital of \$15,000 to distribute the Cletrac line of tractors, made in Cleveland. The sales room and service station is located at 539 North Park street. J. E. Woodland is president and general manager; W. J. Southwick, vice president; E. S. Heminger, secretary, and S. W. Deming, treasurer.

O'Neil Oil & Paint Co., Milwaukee, for 28 years engaged in the wholesale gasoline, oil, paint and varnish business, has made a number of important changes in its organization. The chief change is the acquisition of J. M. McLaughlin as vice president and director of sales. McLaughlin, for the past three years, was general manager of the Wisconsin Cabinet & Panel Co., of New London, Wis., the largest woodworking unit of the Thomas A. Edison industries group. John T. McDermott, formerly auditor with the Edison company, assumes the same position in the O'Neil organization. George F. O'Neil remains as president and general manager; James S. Notter, Thomas F. Hyde and A. F. Schroeder, vice presidents; Edward Pfleger is the new treasurer, and Arthur C. Franz the new secretary.

The Evansbilt Battery Co., Waltham, Neb., is putting on the market a battery of new design, and for which the makers claim many unusual features.

R. & V. Knight Motor Co. has opened a retail branch in Moline, Ill., and R. N. Ward has been placed in charge. The new branch is located across the street from the factory in East Moline, a modern plant being constructed for the housing of the new department. It is planned to take care of the retail service department in connection with the sales agency. D. S. Smith is to be in charge of the latter.

## Guaranty Trust Says Car Prices Reach Stabilization

49 Makes Show Reduction of 22% While Some Others Are as Much as 42½

NEW YORK, March 14—The Guaranty Trust Co. in discussing automobile prices in its monthly survey states that "approximate stabilization of automobile prices is believed in the industry to have been definitely reached."

It then goes on to say: "The average price of 49 of the principal standard touring car models is now 22 per cent below the average price on Sept. 1, 1920, but the price of the greater quantity of cars sold represents a much greater reduction, some as much as 42½ per cent. This reduction has been brought about by a series of price cuts spread over more than a year, so that we now stand at what appears to be the end of the period of price revision rather than at the beginning. In view of known improvements and refinements in the product, no comparison of present prices with those of 1913 is possible or significant."

"This conclusion in regard to stabilization is based not only upon the amount of the average price reduction that has taken place, but also upon the progressively smaller price cuts made recently by leading manufacturers. Furthermore, at least six manufacturers have raised their prices since the first of the year, and there is justification for the belief in an apparent stabilization of the costs of the chief materials entering into motor car manufacture. Many people believe that the prices of raw materials entering into the manufacture of automobiles have reached bottom. In the case of some of these materials a renewal of the upward price trend has been manifested. The average price of metals and metal products is now nearer the 1913 level than that of any of the nine groups, except farm products, for which the Bureau of Labor Statistics compiles price data. It appears, therefore, improbable that automobile production costs can go materially lower for some time."

"Inventories have been well liquidated in the automobile industry and the industry brought to a sound position, where no justification of further general price reduction appears to exist."

## TIRE DEALERS SALES WEEK

Cleveland, March 14—The Cleveland Retail Tire Dealers' Assn., entertained 150 retail tire dealers of this city at a dinner and smoker in Hotel Winton recently.

The members of the association have under way plans for a better merchandise week, during which period tire buyers will be posted on the values offered in standard brands.



# The READERS' CLEARING HOUSE

## Questions & Answers on Dealers' Problems

### INFORMATION ON FORMING A LOCAL TRADE ASSOCIATION

Q—Will you please send me information and plans for organizing a local trade association, having as its members garages, repair shops, tire dealers, battery stations and other branches of the automotive trade? We want mutual collection systems and suggestions on closing hours, copy of regulations and by laws governing trade bodies.—MacDonald Brothers, Battery Service Station, Brazil, Ind.

We are very glad to offer you any advice or assistance that we can in an effort to organize a local trade association in your community. You have, of course, quite a complicated question when you attempt to bring into a single association all the interests that are involved in the service of an automobile, in a city the size of Brazil, Ind.

However, we think this can best be done through following the lines of organizing through the service associations. We believe that you would get the best information of this sort by writing to Alfred Reeves, general manager of the National Automobile Chamber of Commerce at 366 Madison Ave., New York City.

The National Chamber has a service department which has assisted in organizing many local service associations. We are quite sure that Mr. Reeves will be very glad to direct the service department of his organization to send to you the plan they have for such work.

It might be worth your while to communicate, too, with L. M. Shaw, general manager of the Indiana Automotive Trade Assn., 388 North Delaware St., Indianapolis, Ind. It is very likely that Mr. Shaw will be able to give you some personal assistance in forming your association.

### GARAGE LAW IN ALABAMA

Q—Will you please tell me the law on garages in Alabama? What is the law on using a stationary gas engine within the city limits of Birmingham, Ala. The place where I want to build is in the suburbs and there is no power there, so I want to use a gas engine until I can get up enough trade to move in town. This place is a good location. It is on the main highway. I am going to build an electric service station and a tire repair shop to start with. Also tell me what the license on a place like this will be.—M. L. Haynes, Stone Wall, W. Va.

In Alabama the garage man is taxed a license fee of \$75.00 for each garage where a charge is made for storage of motor vehicles, in all cities of 100,000 inhabitants. In such cities he is charged a license fee of \$100.00 for each garage for the repair of motor vehicles. And if he desires to deal in automobiles he is taxed \$125.00 in counties of 100,000 or over and he may not sell outside the county.

### The Readers' Clearing House

**THIS** department is conducted to assist dealers and service station executives in the solution of their problems.

In addressing this department, readers are requested to give the firm name and address. Also state whether a permanent file of *MOTOR AGE* is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert and P. L. Dumas; Legal, by Wellington Gustin;; Paint, by G. King Franklin; Architectural, by Tom Wilder; General Business questions, by *MOTOR AGE* organization in conference.

If he operates an automobile filling station in connection he must pay a state license fee of \$5.00 for each station where only one pump or filler is used, and where more than one filler or pump is used \$20.00 for each additional pump or filler used. If he deals in accessories he must pay \$60.00 for the privilege. These fees are less in cities and towns or counties of a smaller population.

Otherwise the laws governing garages in Alabama are the general laws of business.

You will have to refer to the city ordinances of Birmingham to learn if there are limitations on the gas engine you propose to use, within the city limits. One of the bureaus of that city's government will give you the information desired.

### GASOLINE TANKS IN CITY

Q—In the operation of our filling station here, we have been put to a great deal of inconvenience by the fact that we are forced to buy our gasoline in tank wagon quantities.

We purchased ground along the railroad right of way on which we started to set two 10,000-gallon storage tanks. This ground is in the city limits and is alongside of some warehouses.

We had no sooner started work on the erection of those tanks until twenty-four property owners in that section of the city enjoined us from storing gasoline in the tanks. We failed in our first effort to break the injunction and the case has now been set for trial in the district court.

Not being familiar with Oklahoma law

we would greatly appreciate anything you might have in regard to the same. We enclose a self-addressed, stamped envelope for reply.

If we win this case what sort of damage suits would we have against the plaintiffs and what chance do we stand to win?—Auto Supply & Service Co., Blackwell, Okla.

In *O'Hara vs. Nelson*, a New Jersey case, found in 63 Atlantic R. 836, is an instructive treatise on the subject of gasoline as a nuisance and its dangers. This was an opinion of the court on the question "whether in a thickly built up portion of a large city—particularly where there are numerous frame buildings—parties may store and use so dangerous a substance as gasoline in such large quantities that an explosion thereof would cause serious injury to the adjacent property and be a serious menace to the lives of those in that vicinity."

A preliminary injunction was granted and later, on second hearing, it was made permanent, 71 N. J. E. 629. This opinion, however, passes on facts somewhat different from your own, and the garagekeeper was enjoined from filling automobile tanks within the building which was frame and adjacent to other frame buildings.

The volatile quality of gasoline has been decreased within recent years, so that it is now not much removed from kerosene and will not vaporize in cold weather. So, while formerly, it was included as a dangerous agency and a nuisance per se, the courts are now more generally holding it is not a nuisance per se as used in and around garages. In the case cited above it is said, "whether they are or are not nuisances depends upon the locality, the quantity and the surrounding circumstances, and the method and manner of keeping and use."

In *Ganigan vs. Refining Company*, 40 Atlantic R 834, it was held that gasoline in tanks located within the limits of a city, where adjoining lots were closely built upon, was not a nuisance per se, but the owners of the tanks were held to diligence in protecting the public from injury or discomfort therefrom. This appears to be good law.

If you have no city ordinance regulating the storage of oil, then, whether your tank would be a nuisance is a question of fact from all the surrounding circumstances. From your brief statement these appear to be in your favor.

While one may use his property or land for any lawful purposes, erecting or maintaining thereon anything not in itself a nuisance, still he is chargeable with any negligence in relation thereto. One writer says negligence is the absence of care according to the circum-

stances, and the dangers incidental to the use of gasoline being manifold in an unusual degree, slight omissions of care will weigh heavily against the offender. So without more facts, we are of opinion you may not be permanently enjoined from building as proposed and begun.

If there is but a preliminary injunction now against you, without a trial in the merits, and you are able to win your case on trial and this injunction is dismissed or dissolved, then you should be able to recover on the bond put up by complainants for all the damages occasioned you.

## Advice on Planning Garage and Service Station

### PLAN 372

I am enclosing a sketch of a garage and service station which I am considering building and would like if you could furnish me with some drawings along these lines, or perhaps you may have something in mind that will fill my needs to better advantage.

The service station is to be in a town of about thirty thousand people in the state of Ohio, some thirty miles from Dayton.

My idea is to build and maintain a first class service garage, equipped with the latest machinery, for all cars and eventually take on one or two agencies.

The ten foot wall around the shop was put there to cut off the view from the main service floor and at the same time allow all the circulation of air possible.

Have you any means of obtaining the approximate cost for the structure made of hollow tile stucco facing on front and one side, cement floor, hardwood flooring 45 ft. back from front, complete, less garage equipment.—Roy Hasselback, Detroit, Mich.

Your layout is very good in its general arrangement and we are making suggestions only on a few details which we think you might improve.

In your garage the car spaces are shown only about 10 ft. long while the smallest cars use 12 ft. and large cars require 16 ft. In view of this it would be more efficient to store cars along both sides than at one side and one end.

Access to the office, etc., may be retained by so placing a curb that there will always be a passage left behind the cars.

The space allotted to general office is too small for a building of the size you contemplate; it could be enlarged to quite an extent at the expense of the private office, women's room, etc., the passage need be only wide enough to get a car through easily.

You must be careful in placing your gasoline and oil station to so arrange it that cars will not block the entrance and exit. The air would be better outside or at some other point so that motorists seeking free air will not interfere with gas sales. By making the exit wide cars stopping for gas will not block it. We have indicated the probable course of cars around the pump and with three ordinary positions in taking on gas

there is still passage way for a car leaving.

We will make no criticism of the shop, but believe the space allowed for accessories too small to give sufficient stock-room space. If you plan to keep accessories elsewhere the space is ample.

You might also take 5 ft. from the washrack and add it to the machine room. It would still be plenty large for 3 cars and furnish storage for 4 cars when not in use for washing.

As to the cost of this building we can only make a rough estimate as much depends on the material and labor situation. A minimum cost would be \$40,000 and a maximum would be \$60,000 or even more. In Chicago or any other large city the cost would be \$70,000.

The low wall around the shop is well in summer but not so desirable in winter. Then you will want to conserve the shop heat while the garage may be only a few degrees above freezing, 40 perhaps. Walls extending to the roof with sections that could be opened in summer would be better.

### VALUABLE ESSEX INFORMATION

Following are a few suggestions on W. M. Hicks, question No. 4, Readers' Clearing House.

Mr. Hicks writes that he has noticed a number of Essex cars that spit back through the carbureter when on a hard slow pull, and that he has remedied the trouble by cleaning the distributor.

Would suggest that Mr. Hicks' trouble could be remedied first as the Editor has shown by securing a test set of high grade plugs set at the proper clearance; second, by removing piston from air chamber and polishing same very highly with a good metal polish, also polish surface of air chamber before replacing piston. While piston is out of chamber take a very small three-cornered file and make the groove in the metering pin a little longer.

A piston that sticks in the air chamber will seriously interfere with the action of the carbureter at the same time if the packing gland is loose it will permit excessive gasoline consumption with its attendant troubles.

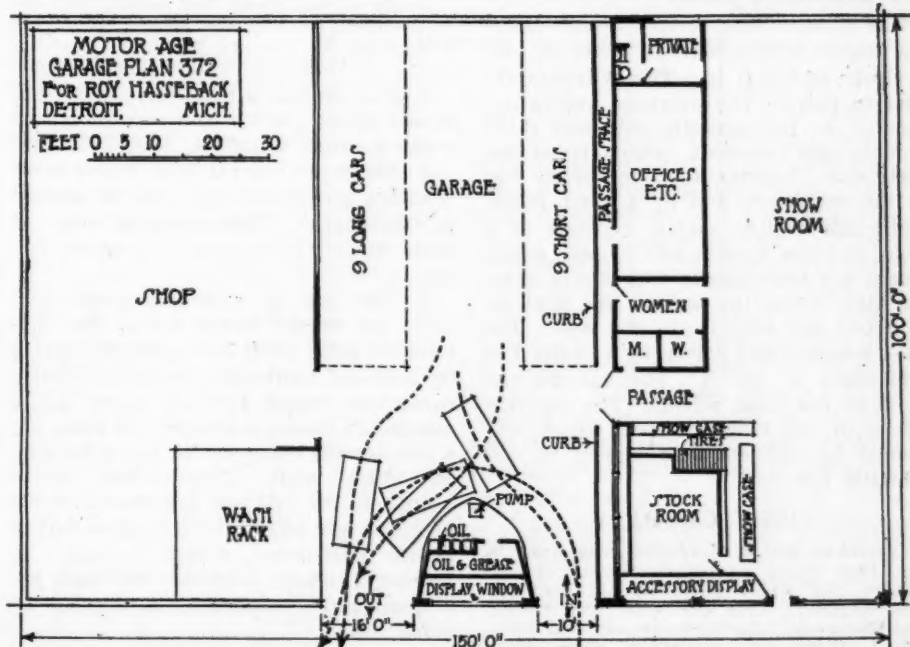
Third, a retarded flow of gasoline into the carbureter usually caused by some foreign matter will cause spitting back into the carbureter. I have had the same trouble with the earlier models and find that by going over the carbureter I have obtained good results.—C. A. MacGowan, Hartford, Conn.

Note—We wish to thank Mr. MacGowan for this valuable information. All of the remedies suggested are logical and no doubt will prove of great benefit to those engaged in the servicing of this make of car.

### CALCULATION OF TAXABLE HORSEPOWER

Q—Give the taxable horsepower on the Marion-Handley 6-10 1917 automobile. The book from which my license was estimated by county official calls for 40 h. p. but the book I looked it up in (this is model 25 Rutenber motor) says 23.43 h. p. Would this not be higher priced for the license when rated at 40 h. p. and would this not be more than any American made car?—Paul Miner, Breckenridge, Texas.

The 40 h.p. used by county official is apparently the advertised horsepower which the engine probably develops, this figure always being mentioned in advertising literature and when selling the car. The technical rating according to the law for purpose of taxation is based on the S. A. E. rating that the horsepower is equal to the diameter of the cylinder multiplied by itself and then divided by  $2\frac{1}{2}$  then multiplied by the number of cylinders. As the diameter of the cylinder is  $3\frac{1}{4}$  ins. the horsepower figures out 23.43 in accordance with the figures you obtained from the Rutenber instruction book and this lower figure is the one on which you should be taxed.



Plan 372—An unusual arrangement of gasoline pump just inside a double entrance with accessory show window between



### WIRING OF 1914 CADILLAC

Q—Publish wiring diagram of Delco system on 1914 Cadillac showing internal wiring of generator.

2—Could a Heinze-Springfield cut-out regulator be used as a voltage regulator in lieu of the mercury well? If so, how could connections be made?

3—Advise why the 3rd wire on Gray & Davis generator as used on a 1913 "R" Velle—French & West Garage, A. W. West, Wanette, Okla.

1—This diagram is shown in Fig. 1.

2—We have no data on the Heinze-Springfield cut-out. It is possible to replace the mercury regulator with a regular Delco reverse current relay. The necessary connections are shown in at "a" and "b", Fig. 1.

The installation cannot be made until the generator has been equipped with a reverse series field winding. This winding can be installed by the Delco factory or any of its official service stations. The internal connections of the system as originally installed are shown at Fig. 2. The connections on the sliding switch type of 1914 Delco motor generator for installation of the vibrating relay type of regulator are shown at Fig. 2. The installation connections to be followed when applying the relay regulator to the shifting brush type of motor generator are shown at Fig. 3.

3—This generator is a governed speed type when running as a generator to charge the battery only the current is drawn from the shunt field, but through the medium of the third connection on the generator the series winding is cut in in connection with the shunt winding strengthening the magnetism and increasing the output.

### BLITZEN BENZ DESCRIBED

Q—Is the Blitzen Benz which was driven by Oldfield and Burham, which held the world's records for quite a long time, front wheel drive or rear wheel drive? Describe the car especially the way it was driven at the time those two men set the records at Daytona Beach.—Chester McKee, Minneapolis, Minn.

The Blitzen Benz carried a four cylinder engine with a bore of 7.2835 in. and a stroke of 7.8741 in. The cylinders are cast in pairs. The overhead valves are located on the opposite side and there is only one camshaft which is on the right side. Lubrication is by splash feed in the crankcase and by a hand pump, while the cooling system consists of a Benz radiator system and a gear pump. There are four speeds with direct drive on high, while the wheels are 32x4 in. in front and 34x5 in. in the rear. The rear wheels being driven by a chain. The wheelbase is 108 in. The car did not drive to the front wheels. The car that drove to the front wheels which was owned by Oldfield was known as the Christie car.

### KISSEL CAR DATA

Q—What make of engine was used in the 1918 three passenger Kissel coupe? Where can repair parts be obtained for this engine? This car was in a wreck and the model numbers are not available.

2—Is there any governor made that could be used on this engine, if so, what make and where can it be purchased?

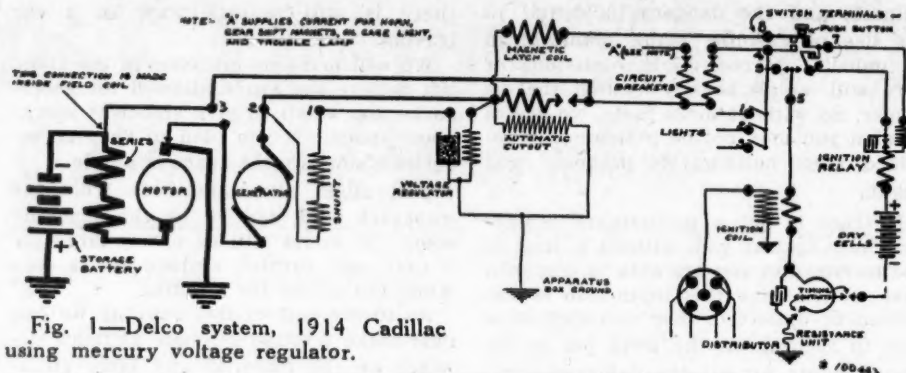


Fig. 1—Delco system, 1914 Cadillac using mercury voltage regulator.

Fig. 2—Delco sliding switch type of motor generator.

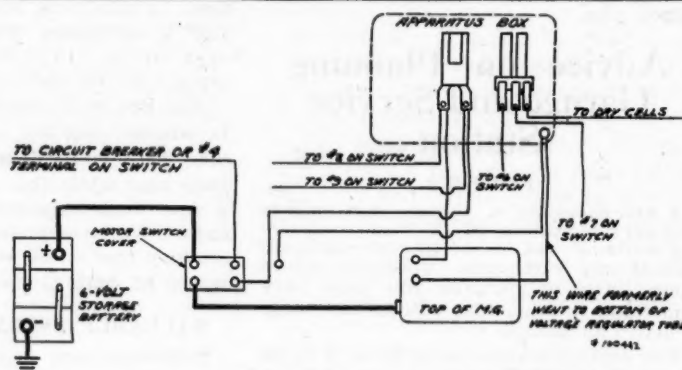
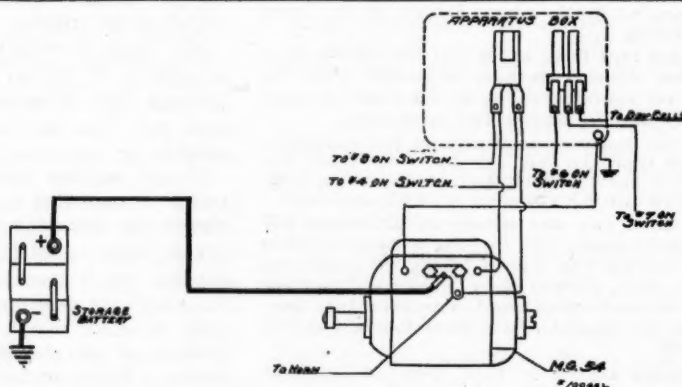


Fig. 3—Showing connections for regulating relay installation on 1914 brush shifting type motor generator.



3—Would this engine start easily with a Dixie magneto, and should I use an impulse coupling?

5—Have you plans that would help me in building a portable power outfit for belt work for cutting wood and shelling corn?—D. H. Kelly, Orvillia, Iowa.

1—This engine is manufactured by the Kissel Motor Car Co. and repairs can be secured direct from the Kissel factory.

2—There are several firms which manufacture governors that can be applied to this engine. The names of some of these firms will be supplied you by letter.

3—This car is either a model 100-point six or the model 6-42. The one-hundred point six is an engine of 3½x4½ in. bore and stroke and requires a Zenith carburetor model E-T-4A, which has a number 21 choke, a number 100 main jet, a number 105 compensator and a number 60 idling well. The other engine known as the 6-42 has a bore and stroke of 3½x5 and should be equipped with a Zenith carburetor model H-T-5A. A number 21 choke, a number 100 main jet, a number 110 compensator, number 50 idling well.

4—We would recommend that you install an impulse starting coupling on this

engine. It will greatly facilitate starting.

5—We have no plans for the construction of such an outfit as you mention. Would suggest that you communicate with some of the well known farm journals who no doubt will be able to supply this information.

### GEAR RATIO OF 1920 ROAMER

Q—What is the gear ratio of the Roamer four passenger touring serial No. 183422, engine No. N39779?

2—How can we speed up this car?

3—Will it handle a 3½ gear?

4—Where can gears for this car be obtained?—E. W. Vincent, Sterling, Colo.

1—3.84 to 1.

2—This engine can be speeded up by following the numerous suggestions offered to owners of Continental engines. They include raising the compression, lightening all reciprocating parts, such as pistons and connecting rods, advancing the ignition and a general lightening up and balancing of all moving parts.

3—Yes. If not used in parts of the country where hills are frequently encountered.

4—This will be answered by letter.

## OLDSMOBILE USES OWN ENGINE

**Q—Where can I secure a book on Real Practical Automobile armature winding? A book which will cover it very thoroughly.**

2—Tell what the torque should be on different motors.

3—What advantage has third wire in lighting system on Franklin? Publish wiring diagram.

4—How do you tell the difference between 6-volt and 12-volt motor generator with all markings removed?

5—In your list of passenger cars you list Oakland and Oldsmobile six with their own engines. I am told that these are Northway engines.

6—What is the valve setting on Northway engine in degrees.—A. Reader, Cleveland, Ohio.

1—This question will be answered by letter.

2—This information is given in the high grade Automotive Electrical Wiring Diagram books or service manuals. When it is not given in these books it can be secured from the manufacturer, or through the Readers' Clearing House in Motor Age. The names of firms supplying these books will be sent you by letter.

3—This is done to secure the necessary switch connections for the double bulb headlight two-wire system. The wiring diagram is shown in Fig. 4. This diagram is to be used for cars with serial number of 24613 and after.

4—There is no positive way to determine this unless the machine in question is put to a test for ohms resistance based on the wire size.

5—The engine in Oakland and Oldsmobile cars listed as their own because the Northway Motor Co. and the Oakland and Oldsmobile Motor Car Companies are units of the General Motors Co. and are therefore listed as using their own engines.

6—The timing of the Northway as used in the Oldsmobile model 37 is as follows: Inlet opens 17½ degs. after upper dead center, inlet closes 38 degs. after lower dead center. Exhaust opens 42½ degs. before bottom dead center, exhaust valve closes 7½ degs. after upper dead center. The correct timing for the Oakland is as follows: Intake opens after upper dead

center  $17\frac{1}{2}$  degs. Intake closes after lower dead center 36 to 38 degs. Exhaust opens before bottom dead center  $42\frac{1}{2}$  degs. Exhaust closes after upper dead center  $7\frac{1}{2}$  degs.

## REMOVING LIME DEPOSITS

**Q—What is your opinion of the Thermol engine that Sears, Roebuck & Co. sell? We want an engine for charging batteries and expect this engine to run ten hours daily and keep it up. Will this engine do it?**

2—What will remove lime from the hopper of a water cooled engine? This lime is about  $\frac{1}{8}$  in. thick over cylinder and hopper walls.

3—How can a crystallized axle be detected, for instance one axle shaft breaks in a Ford and how can you tell whether the other axle shaft is ready to be replaced by a new one, as there are many times that the old axle shaft was left in, will break, and then the mechanic that did the job will get the blame?—T. E. Thompson, Newman, Ill.

1—We have no data concerning the Thermoil engine but believe that this firm's reputation for fair dealing would insure that you would get satisfaction from any article purchased from them. Regarding the reliability of the engine we know nothing other than they have been sold in large quantities by this company.

2—You state that this is a hopper cooled engine. The quickest and most thorough method to remove the lime from this engine would be to use a cold chisel. Deposits of lime where they are inaccessible to tools such as cold chisels can be softened somewhat by the use of muriatic acid or the various solutions of Oakite.

3—There is no definite way to detect a crystallized axle unless the person is equipped with very extensive equipment. The only test possible to give a shaft in the average garage is to examine it carefully and if it shows no external defects it could be considered as being a perfect shaft. A good method to pursue in replacing one axle shaft is to convince the owner that the opposite axle shaft should be replaced, automatically relieving the mechanic of any undue blame.

## KNIGHT EXPERT DISCUSSES MAINTENANCE OF KNIGHT ENGINE

Please pardon my presumption in questioning your verdict published in your Jan. 13 issue. From what experience I have had with Knight motors, and it is not inconsiderable, I would suggest that Mr. Fred Beach check the timing on his Willlys-Knight, especially the eccentric shaft timing. It is possible that in 35,000 miles driving, it has been necessary to install a new eccentric chain. And, while a Knight motor will run with from one to three teeth out of the road, it is not apt to be very satisfactory.

In the second section of your answer you repeat the time-worn injunction, "Do not remove carbon of gummy oil from behind the junk rings." Supposing you find a motor that, in course of time, has accumulated heavy deposits of very hard carbon behind the junk rings and, on removing the heads, the springing action of the rings dislodges particles of hard carbon at the top of the ring slot, the same dropping down and holding the ring in its open or expanded position.

How would you propose to put that head back? I have seen so-called mechanics replace heads that were so tight that it was necessary to use a heavy mallet to drive them down after they had been forcibly started into the inner sleeve.

Such practice often results in broken junk rings and ruins sleeves. I would not remove a particle from behind junk rings unless absolutely necessary. And, in the same connection, I might add that I would not hesitate to remove any or all of it before I would resort to force in order to replace the head.

Carbon behind junk rings can be built up very rapidly, by introducing cylinder oil into the combustion chamber after the engine is well warmed up, through the priming cocks on the intake manifold, while the engine is running, say, about a teaspoonful once a day for the first four or five hundred miles after the engine has been overhauled. This means one teaspoonful per cylinder.

Careless and ignorant handling of Knight engine by repair men who are not thoroughly conversant with them, has resulted in more Knight failures than can be charged to any other one cause. There seems to be a superstition among buyers that, "if you get a good Knight, you are in luck." The whole truth of the matter is that, unless a Knight motor can be serviced by competent mechanics who are in sympathy with the Knight principle, that Knight runs best which is serviced least, I am sir, John A. Forgrave, Helena, Ohio.

Note—We are printing above letter because it is both interesting and instructive. Mr. Forgrave states that Mr. Beach should check the timing of his Knight engine. If the question submitted by Mr. Beach is carefully read you will note that the last sentence is as follows "Timing is all right." The answer was given on the presumption that Mr. Beach referred to the timing of both the valves and the ignition. We heartily agree with Mr. Forgrave in his views regarding the removal of carbon from the junk rings, although we doubt whether any reasonable, thinking mechanic would install a head where he had to pound it down into the sleeve.

## READER WANTS BOOK ON STORAGE BATTERY MAINTENANCE

Q—Advise where a book on storage battery charging, rebuilding, etc., can be purchased.—W. E. Blumentritt, Mound Prairie, Minn.

The names of firms supplying these books will be sent you by letter.

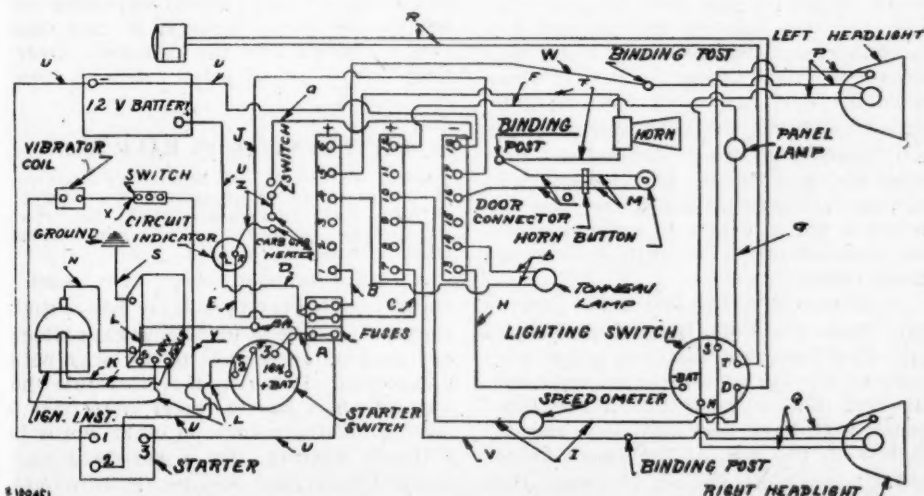


Fig. 4—Wiring diagram of Franklin cars after Serial No. 24613



## Principle of Oscillator Magneto

Q—Explain the principle of the low tension oscillating type magneto as used on some stationary engines, Webster for instance. What should be the amperage draw to the field windings other than renewing the armature bearings and recharging the magnets, what else can be done to make this car produce a good hot-spot?

2—We have an Oakland car 1917 model with Delco single unit equipment which gives trouble when, with the ignition switch engaged, the starter will hardly turn the motor, but if we release the ignition button the starter whirls the motor very rapidly. With either generator brushes lifted off the commutator it will operate. Give remedy for this.

3—We recently had two Delco generators shipped to us from the Cole Eight company and an Oldsmobile that charged at a very high rate. We lengthened the third brush slot as far as possible, but this only brought the charging rate down to about 15 amperes. Everything tests alright. What causes this and is it possible to insert a resistance in series with the field to help cut down the output. Are there any other remedies?—Kimball & Bierman, Holdrege, Neb.

1—There are two forms of low tension magneto systems. One where the armature of the magneto revolves continually and current is taken off the same way as it would from a dynamo. In the other form the armature of the magneto is revolved through about  $\frac{1}{4}$  of a circle by releasing the spring attached to a lever on the armature and at the same time the igniter points in the hammer break type of igniter are separated.

The oscillating system is shown in Fig. 5, in which at "I" is shown the magneto at the left with the permanent magnets "B" in a movable shield "C" which revolves between the armature and magnet poles "D." The rod "H" in the position as shown separates the igniter points indicated by dotted lines.

As the proper time for ignition approaches a dog "K" on the camshaft comes in contact with the lever "L" which is attached to the shield "C." Referring to diagram, the cam "K" has swung the lower end of the lever "L" to the left and with it the shields "C" against the resistance of the large spring "SS"; at the same time the rod "H" is then drawn to the left, allowing the spring "S" to draw the movable electrode on the inside of the engine. The moment after the lever "L" slips off the end of the dog "K" the spring "SS" pulls the lever back into the position shown in "I" and the shield revolves to the left generating a momentary current by breaking the lines of magnetic force passing from poles "C" to the armature "A."

This answers the same purpose as moving the armature "A" through the same arc as already referred to. The maximum current is generated just as the point of the shield passes the corner of the rocker arm "G" separating the igniter points on the inside of the engine. The two working together cause the break to be made at the point of the highest electrical pressure and an intense spark results.

This system which is modified more or

less according to the maker is in extensive use on large stationary engines. We have no figures on the amperage draw of the field windings. If the magnets were charged and the magneto overhauled completely the trouble is due to improper setting of the armature. The arm which oscillates the armature should be so set that the make and break points in the engine separate at the point where the armature gets the peak of the electrical current, this is shown in the diagram.

In most magnetos of this type this position is approximately  $\frac{1}{8}$  of a revolution past the point where the armature will assume a position naturally.

2—This condition is due to trouble in the mechanical switch. The mechanical starter switch utilized on this generator opens the generator circuit and allows

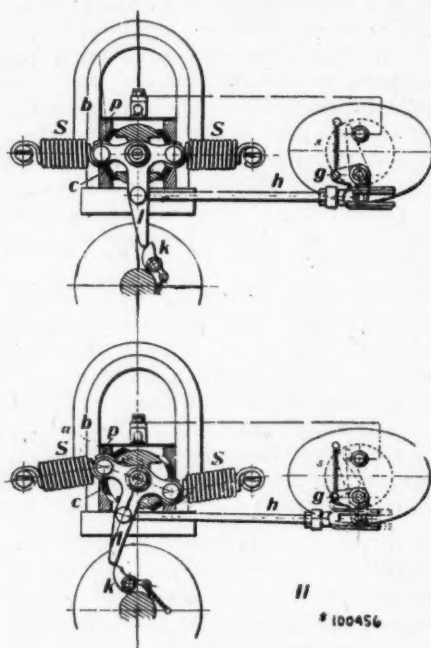


Fig. 5—Typical oscillating type magneto

the motor brushes to come in contact with the commutator closing the starting circuit to crank the engine.

It should lift the generator brush at the same time. In your case this switch is not lifting the generator brushes. The fact that the wire to the ignition coil is connected to the generator shunt field causes all the current to flow to these windings when the starter switch is depressed because the generator brush is not lifted from the commutator. Perhaps the mechanism has become bent through accident or neglect or that the brush is too long and does not lift from the commutators. Carefully check over these points.

3—In regard to the two Delco generators from the Cole Eight and Oldsmobile would suggest that you make sure that the third brush lead is not grounded. We also think it likely that a new third brush may have been installed and attached on the side of the brush holder toward the pivot instead of away from the pivot.

This would have the effect of increasing the output and we would therefore suggest that you check this and make sure that the brush is installed on the side of the brush holder away from the pivot, also making sure that the brush has been carefully sanded so as to have a good bearing on the commutator. The use of a resistance is of course possible but we do not believe that it should be required if you have carefully checked the points above mentioned.

## READER SEEKS ADVICE ON FOUR SPEED TRANSMISSION

Q—Would you advise installation of four speed transmission on Ford touring car? Is installation difficult?

2—What is wrong with a Ford Holley carburetor when best mileage obtainable on long tours is only 12 miles per gallon, although mixture has been set as lean as possible and still have engine run properly. Engine appears to have plenty of power.

3—Would you recommend installation of combined inlet and exhaust manifold on Ford car during the summer months? Would they save an appreciable amount of gasoline? Give details.—Roman F. Penkert, New Elm, Minn.

1—This will be answered by letter.

2—In the Holley carburetor which gives poor mileage it is possible that the jet is worn so that accurate adjustment is not possible. It is also possible that this is an old style Holley which is not suitable for present day fuel. Since 1919 the Holley carburetor has been using a different size nozzle which is more suitable for the fuel being used today.

It is quite likely that there is some other trouble on the car which accounts for the low gasoline mileage, for example, a slight leak at the tank or sediment chamber even though only enough to keep the outside surface of the sediment chamber wet will nevertheless cause considerable loss of gasoline. It is also possible that while the engine runs fairly that the compression is not what it should be due to possible leakage past piston rings or poorly seated valves which may account for excessive consumption of fuel.

3—The combination inlet and exhaust manifold, while very helpful in winter is not suitable for the car in summer as the gasoline vapor entering the cylinder is overheated and thereby expanded reducing the actual amount of fuel that can be drawn into the cylinder. Overheating is also noted under these circumstances.

## DIFFERENTIAL IN RACE CAR

Q—I have been told that the Frontenac racing cars use no transmission or differential. Does this mean that one rear wheel has to slide on a turn?—Davis Bumett, Kansas City, Mo.

A—The Frontenac race cars used a transmission gearset but no differential. It is quite common for racing cars which are used on speedways to do away with differential. It is true therefore that the outside wheel has to travel slightly farther in making a turn, in other words it will slip slightly. On a speedway this can be disregarded because the turns are very gradual.

### BATTERY CHARGING OUTFIT

Q—Can a storage battery charging outfit only be made from 110 volt direct current or else from alternating current?

2—Publish diagram showing how many light sockets and what kind of ammeter is needed.

3—Can either 6 or 12 volt battery be charged with the same outfit?—A Subscriber, Cleveland, Wisconsin.

A—Direct current is the only kind that can be used with a lamp bank or rheostat. For alternating current either a rectifier is required or a motor generator set.

2—The sketch in Fig. 6 shows circuit in which three batteries and the ammeter and lamp bank for resistance are shown connected to 110 volt terminals. This method is not very good except for emergencies or very occasional use on account of the electric energy which is wasted, as most of the electrical current paid for is used up in the lamp.

If only one or two batteries, that is 6 or 12 volts of batteries are to be put on charge, you can figure about  $\frac{1}{2}$  an ampere to each lamp, assuming that 16 candle-power carbon lamps are used. With the 8 lamps shown in the sketch we would then have 4 amperes. Most any ammeter will do, for example, the type used on a Ford car, if no other is available.

In connecting batteries to each other care should be used to see that they are connected from plus to minus as shown. Also that in connecting to the 110 volt terminals that connection is made plus to plus and from minus to minus.

3—Either 6 or 12 volt battery can be charged as indicated.

### LOW GRADE PORCELAIN?

Q—What causes a spark to jump from the porcelain to the jam nut when it is cold? The porcelain was examined and found in good condition. The plugs were removed and placed near the fire and warmed and put back into the engine and the engine started without difficulty.—Claude Press, Blue Ridge, Texas.

This phenomenon can be traced to a low grade of spark plug insulator. Low grade porcelain shows a drop in its dielectric or insulating strength with a drop in temperature. This condition would not exist if the porcelain were high grade. These low grades of porcelain contain moisture. The application of heat will reduce the moisture content and simultaneously increase insulating or dielectric strength of the porcelain. In the case of a thoroughly dry substance, however, increase in temperature has a reverse effect.

### NECESSARY TO FIT NEW BEARINGS

Q—Could an exhaust valve lose its temper so it will not hold its seating long?

2—When a new bearing or piston is bought at a Ford service station do they have to be fitted or are they already fitted?

3—Explain driving control of a Pierce-Arrow.—Forest Cripe, Toledo, Ohio.

1—It is possible for an exhaust valve to lose its temper, however, most exhaust valves lose their seat through pitting or warping or burning rather than loss of temper.

2—The bearings must be fitted to the shaft on which they are to be used. They do not come already fitted.

3—We do not quite understand what you mean by driving control. We are of the opinion that you mean, though, the different shifts of the gear set lever. Reverse speed on this car is secured by pushing down on the ball top of gear shifting lever and pulling the lever to the inside and to the rear as far as possible. In order to get in reverse it is necessary to depress this ball or top of the gear shift lever.

First speed is the position just forward of the reverse speed on the inside, second speed is the position farthest forward on the inside of the "H" plate. Third speed is the outside rear position of the lever. Fourth speed is the outside forward position. Any further information you wish on this car we would suggest that you secure it from the instruction book of the year corresponding to the car on which you wish to secure the information.

### GENERATOR TROUBLE WITH 1920 OVERLAND

Q—We are having trouble with a generator on 1920 model Overland Four which operates in warm weather but does not charge in cold weather except after running for quite a while, the trouble apparently being due to excessive amount of oil working into the generator. We enlarged the oil drain hole  $\frac{5}{32}$  in. but this did not seem to correct the trouble.—C. G. Jones, Mt. Sterling, Ill.

A—When excessive oil gets into a generator it works onto the commutator and from there onto the brushes which absorb a certain amount of the oil so that the surface of the brushes which is in contact with the commutator becomes covered with a glaze which has insulating characteristics. Such brushes will appear to be all right and yet will continue to give the trouble you describe. Would therefore recommend that you try a set of new brushes as we feel this will overcome the trouble.

### REMOVING VIBRATION DAMPER ON 48 HAYNES

Q—Advise proper way to remove vibration damper on model 47 Haynes. Is it possible to disturb the adjustment of this damper?—A Reader.

The vibration damper on this engine is secured to the shaft by means of a key. There also are four screws which hold the damper to a flange. They are locked by a wire through the heads of each. If the screws are removed the flange and holes should be marked so that it will be put on in the same manner. The main part, however, is held on by a key. The heads of these screws should point toward the radiator.

### CHANGING ENGINES IN WILLYS-KNIGHT

Q—We have a Willys Knight 38-4 chassis in which we would like to install a  $3\frac{1}{2} \times 5\frac{1}{4}$  Continental engine. Are these engines inter-changeable?—McCullough & Beach Co., Cambridge, Ohio.

A—There is no data available to show whether it is possible to put the Continental engine in the chassis you have. The engines are not interchangeable so in any event it would mean considerable work in making the change. It is one of those jobs which must be worked out individually. There are always some special brackets or castings to be made and these can only be determined when you have on hand the chassis and engine, so necessary measurements can be made.

### TWO WELL KNOWN MECHANICS

A letter signed "Two Well Known Mechanics," dated Milwaukee, asks MOTOR AGE to settle a dispute as to whether there is such a thing as a rotary valve engine. That is a queer question for "Two Well Known Mechanics" to ask. How a mechanic who is in the business can escape knowing something of rotary valves is a mystery. We do not blame them for asking the question anonymously. It is rather asking too much for a paper like MOTOR AGE to print a diagram of a rotary valve engine merely to prove there is such a thing. Numerous diagrams of rotary valve engines have been published in this magazine.

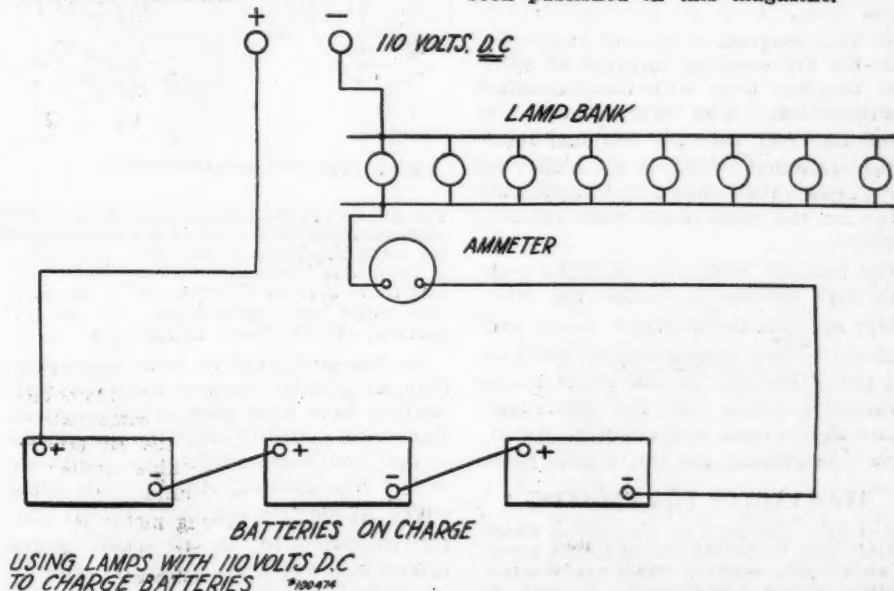
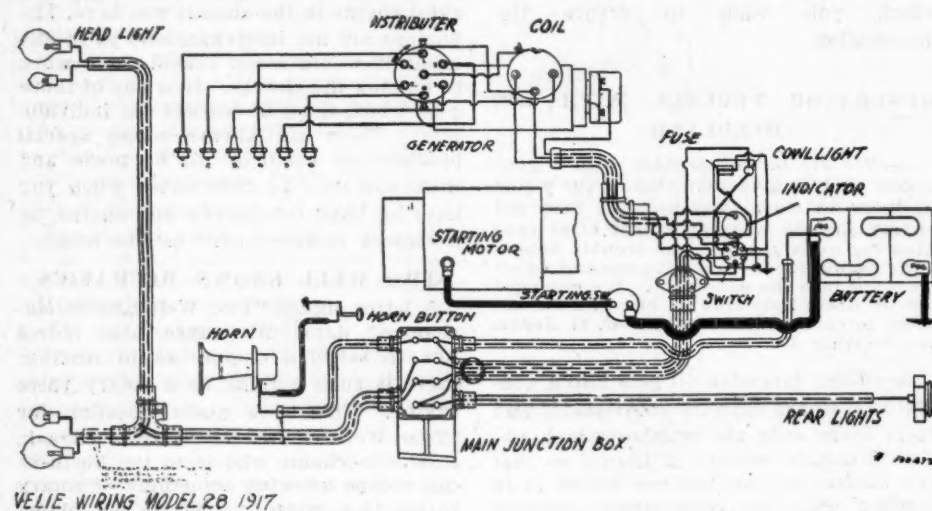
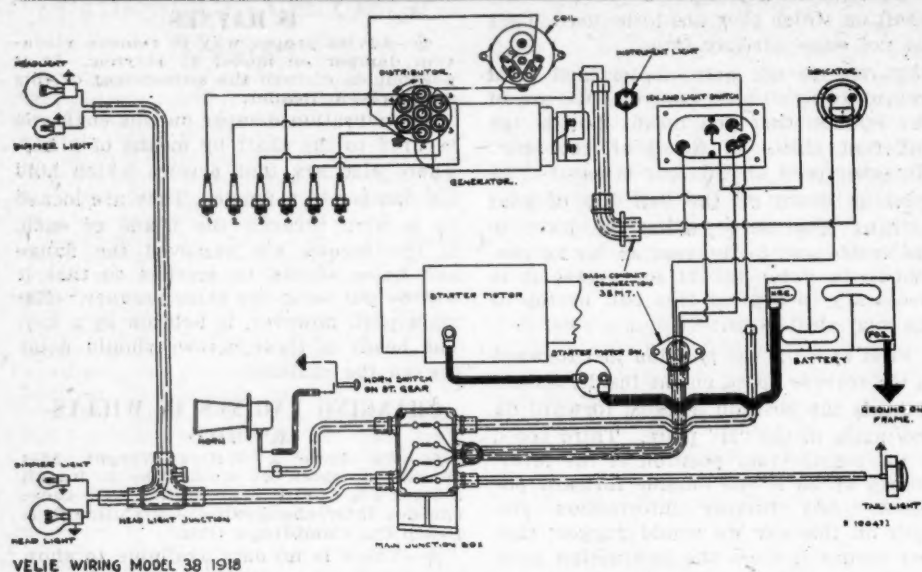


Fig. 6—Charging batteries with 110 volts D. C.





### WIRING DIAGRAM OF 1917-18 VELIE

Q—Publish wiring diagram for 1917, also 1918 Velie.

2—Publish wiring diagram for a 5 terminal Splitdorf coil used with National magneto on 1914 Apperson. The coil has five terminals.—D. E. Foster, Des Moines, Iowa.

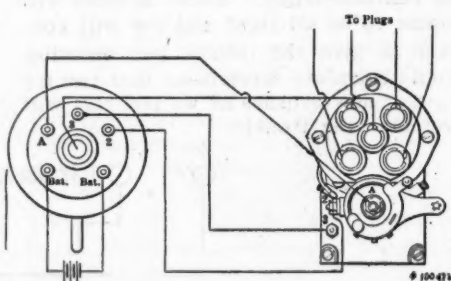
1—This diagram is shown above.

2—We are showing diagram of Splitdorf magneto used with the 5-terminal Splitdorf coil. The only difference in using this coil with the National interrupter terminal which is up higher on the magneto than shown in this diagram being on the same shaft with the distributor.

The trouble with the National magneto may be due to having the interrupter and distributor timed wrong with respect to the armature. In checking this the interrupter should be set in the advanced position and the interrupter points should open just about as the armature is leaving the tip of pole piece.

### AIR STARTER FOR ENGINES

Q—I have designed an air starter which I think may be better suited to the needs of automobile engines than the electric starting motor. The device I have in mind has only one rotary valve which acts as both intake and exhaust valve. Also,



the air motor is not larger than the ordinary starting motor and I believe it could be made interchangeable with the latter. I know that air starters have been used and there may be nothing new in my idea. Are there any advantages to an air starter?—F. W. Beall, Dillan, S. C.

A—You are right in your assumption that air starting devices for automobile engines have been used to some extent. The great difficulty with the air starter is that you need considerable equipment to get the desired results. In other words an electric starting motor is simple compared to an air tank, pump, valves, etc., which are necessary with an air starting device.

The modern starting and lighting sys-

tem has been pretty well worked out for automobiles and it would take considerable effort to induce car manufacturers to change to some other system, especially one that has been rejected in the past.

### SPEED OF DODGE BROTHERS CAR

Q—Is the Dodge touring car a strongly built car?

2—What is its maximum speed?

3—Which is the faster a Reo touring car or a Dodge touring car?

4—What is the maximum speed of a Chandler seven passenger touring car?

5—Why are pumps usually used on racing cars?

6—What is the best engine to use for a Ford racer for a ½ mile dirt track?

7—How can anyone get into the races?—John Barna, Jr., South Bend, Ind.

1—Yes.

2—50 to 55 m. p. h.

3—You do not state the model of the Reo. However, both these cars have approximately an equal speed.

4—Approximately 60 m. p. h.

5—Oil hand pumps are used on racing cars to supply an extra quantity of oil for lubrication of the engine at extremely high speeds. Sometimes a pump is also used for the fuel feed system to keep the pressure on the gasoline. These hand oil pumps are merely auxiliaries to the regular lubrication system and are used to add the extra oil needed for sustaining high speeds.

6—We know of no best engine to use in the Ford for one-half mile dirt track, however, most of the successful Ford half-mile dirt track racing cars are equipped with overhead valves and have a gear ratio of approximately 4 to 1. Where the rear axle gear ratio is not changed the rear wheels generally are cut down to about 28 in. This is necessary in order to secure a good get-away on the short straight-a-way.

7—To enter into half-mile race it is necessary to communicate with the management of the place or association under whose jurisdiction the race is being given. Another method is to join some dirt track racing team.

### FORD SERIAL NUMBERS

Q—Give me serial numbers of Ford automobiles by year. Also location of serial number on engine.—G. E. Gayler, Cambridge, Mass.

The following numbers are from Aug. 1 to July 31, 1915-1916, 855501 to 1362200; year 1916-17, 1362201 to 2113500; 1917-18, 2113501 to 2756251; year 1918-19, 2756252 to 3277851; year 1919-20, 3277852 to 4233350; year 1920-21, 4233351 to 5223135; year 1921-22, 5223135 and up. The location of the number will be found on the left side of the cylinder block immediately above the water inlet.

### 1914 CADILLAC ENGINE IN BOAT

Q—We are placing a 1914 Cadillac engine in a boat and would like to have a horse power curve of this engine.—Geo. J. Achweizer, Greenville, Wis.

A power curve of this engine is not available, but we know that the brake test of this engine will show up around fifty horsepower.

# SERVICE EQUIPMENT

## *Aids for Time Saving & Accuracy*

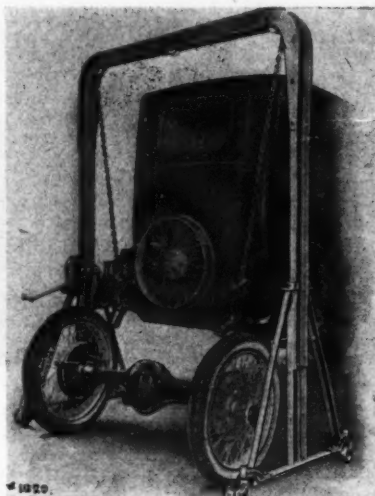
### WALLACE BAND SAW

The Wallace Band Saw, as it is pictured on this page, comes as something of an improvement and is intended for use in the service station where this type of tool is needed.

All adjustments are controlled by hand wheels or thumb screws, without the use of special tools or wrenches.

The height of this band saw is five feet nine inches over all; the table is 42 inches from the floor; floor space required is only 15 by 29 inches. The motor, a  $\frac{1}{2}$  horse-power General Electric, is ball bearing, and runs at 1750 revolutions per minute; the saw runs at 3150 feet per minute.

The blades used are made for this machine. They are of special steel treated and cut so as to serve the greatest number of producing hours on this size wheel. J. D. Wallace & Co., Chicago, Ill.



Weaver car hoist

### HOERNER REAMER GUIDE

Hoerner Reamer Guide, which fits inside the valve and supplies a true center hole through which the reamer may work, is made for all sizes valves, the price being, for Ford and Chevrolet, \$1.25 postpaid in U. S. and for all others \$2. Made by the Hoerner Mfg. Co., 3929 Moneta Ave., Los Angeles.

### HERCULES VALVE LIFTER

The Hercules Valve Lifter is intended to lift the valves in any motor. The plunger, illustrated, locks in place and permits the use of both hands. It is made of malleable iron and reinforced at points of tension. List price, \$5.00. Hercules Products Co., St. Joseph, Mich.

### WEAVER CAR HOIST

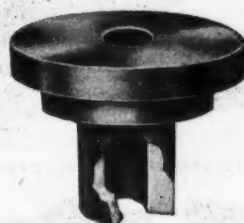
The Weaver Car Hoist is another addition to the Weaver line of service equipment devices and is intended for use in the service station, especially where space is valuable, because of its size. The cut illustrates how the hoist is made. Weaver Shop and Garage Equipment Co., Springfield, Ill.



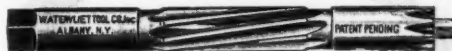
St. Louis gasoline pump



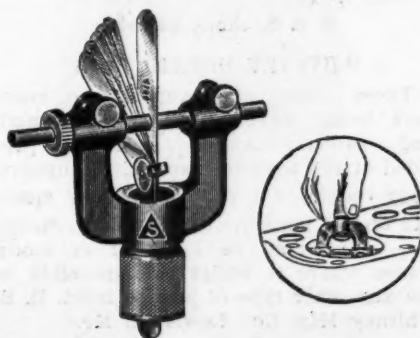
Wallace band saw



Hoerner reamer guide



Watervliet spiral expansion aligning reamer



Stevens cylinder micro-gage

### COLUMBIA ELECTRIC GRINDER AND BUFFER

The electric grinder and buffer shown here is built for light work in the machine shop, garage, service station, and is also used on the farm. The motor is  $\frac{1}{3}$  h.p., single phase A. C., 60 cycle, 110 or 220 volt being interchangeable. Speed 1800 r.p.m. It is equipped with S. K. F. ball bearing and entirely enclosed in dust-proof case. Switch and fuses are furnished with the machine. Emery wheels not furnished. Prices, \$96.25 for No. E-60 and \$87.50 for No. E-61. Columbia Mfg. Co., Belleville, Ill.

### ST. LOUIS GASOLINE PUMP

The St. Louis Pump & Equipment Co. has brought out, within the last few months, a number of pumps with various improvements. Motor driven gasoline pumps with improvements, such as pictured here, are among the latest designs offered by this company, whose headquarters are at St. Louis, Mo.

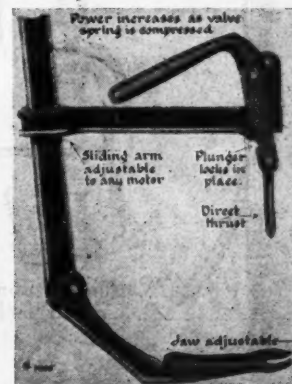
### WATERVLIET SPIRAL EXPANSION ALIGNING REAMER

The Watervliet Tool Co., Albany, N. Y., has on the market a number of reamers for use on all kinds of cars and trucks. Perhaps the cut will better explain this tool. It is made of properly machined tool steel and combines boring and reaming. It is adapted to piston pin work. It has a self-cutting pilot which does rough cutting. Prices range from \$15 to \$21.

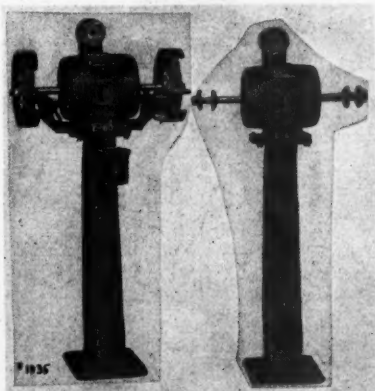
### STEVENS CYLINDER MICRO-GAGE

This gage consists of one fixed pin and one adjustable pin, mounted in a holder. The combined length of both pins, when together, equals the exact standard size of the cylinder to be measured (in case of Ford,  $3\frac{1}{4}$  in.).

May also be used as a standard over-size gage by inserting the required blade of a thickness gage between the pins. Price, complete, \$2.50. Stevens & Co., 375 Broadway, New York.



Hercules valve lifter



Columbia electric grinder and buffer



# The ACCESSORY SHOW CASE

## New Sources of Retail Profit

### DETROIT MOTOR DRIVEN PUMP

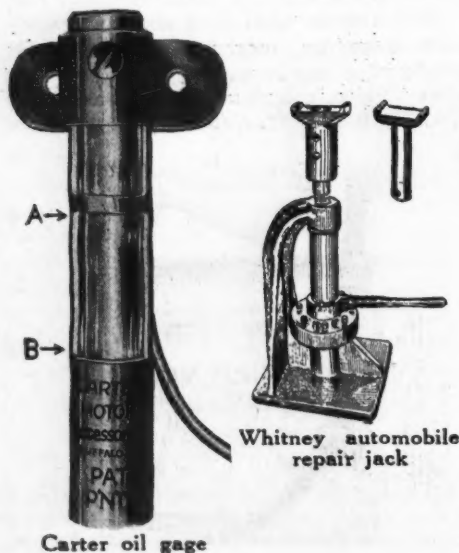
A new motor driven tire pump suitable for transmission or other type of installation in which it is claimed that the air chamber requires no oil, has been brought out by the Detroit Carrier & Mfg. Co., Detroit, Mich. The pump is a diaphragm type in which the diaphragm is driven off the pump shaft by a crank and connecting rod arrangement. The pumping is effected by the reciprocation or pulsation of the diaphragm and, consequently, requires no lubrication. The pump is so manufactured that replacement of the diaphragm is a simple matter should it become necessary and consists of but very few moving parts.

### CARTER OIL GAGE

The Carter oil gage is attached to instrument board and connecting tube is attached to lower petcock with an elbow. The liquid in glass tube in gage indicates the relative amount of oil in the crankcase. When liquid in gage is at "A," the oil in crankcase is at upper petcock level. When liquid in gage is at "B," the oil is at the lower petcock level. No plungers, floats or other moving parts are used. Can be attached to all Ford models and Chevrolet model 490. Price \$3. Carter Motor Accessories, Inc., 386 Pearl St., Buffalo.

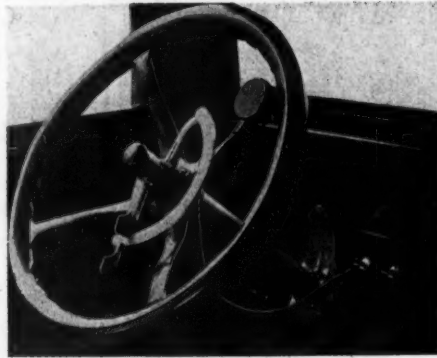
### WILCOX ELECTRIC GASOLINE GAGE

The Wilcox electric gasoline gage fits any tank and is quite simple in installation. It consists of a heavily insulated cable with a dial at both ends, one dial is before the driver on the dash, the other replaces the cork float rear tank gage. Operates from the ignition switch through a commutator brush attached to the cork float which is in unit with the gasoline tank dial. Wilcox Pressed Steel Co., 1713 Armitage Ave., Chicago.



Carter oil gage

Whitney automobile repair jack



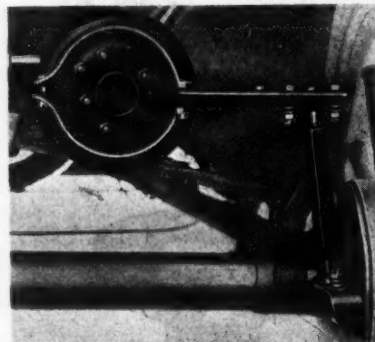
Haines improved lighting switch



Gray automatic ignition cutout



Wilcox electric gasoline gage



Blackmore shock and roll preventer



S. &amp; S. shock absorber

### WHITNEY REPAIR JACK

These jacks are proportioned, every part being webbed to assist strength and safety. Ample area is provided at the base to insure firm support. They require but very little floor space and do not combine much weight, therefore, they may be operated in many places where it would be impossible to use any other type of jack or hoist. R. S. Whitney Mfg. Co., Lewiston, Me.

### BLACKMORE SHOCK AND ROLL PREVENTER

The Blackmore shock and roll preventer is built on a principle which utilizes the friction of the parts inside the device to regulate the compression of the springs when the car is in motion and to check the violent rebound of the springs after the wheels have passed over a bump. These shock absorbers can be attached to the standard bolts on the Ford frame and axle without changes. Price \$28 per set of four. Charles C. Blackmore Co., Dayton, O.

### GRAY SAFETY FIRST AUTOMATIC IGNITION CUTOFF

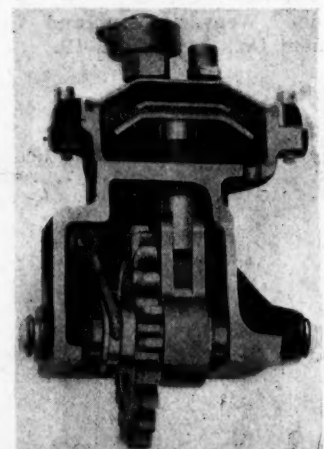
Prevents Fordson tractors from turning over backwards. Can be installed on tractor for \$15, and prevents tractor rearing backward by immediately stopping the engine by cutting out the spark when front end leaves the ground 22 inches. It can be adjusted to break ignition contact when tractor reaches any angle that would cause an accident. R. H. & H. C. Gray, Seattle, Wash.

### HAINES IMPROVED LIGHTING SWITCH

Benefits derived from the Haines improved lighting switch are that the tail light may be dimmed alone, dimmers may be lighted alone, dimmers and spot light may be operated alone, and so on. Any one light or combination of lights can be individually controlled from one switch.—Muskegon Valve & Mfg. Co., Muskegon, Mich.

### S & S SHOCK ABSORBER

S & S shock absorber allows easy recovery from shock, because the shock is stopped at the spring before reaching the frame, thereby assuring easier riding. Starkweather-Snook Co., Moline, Ill.

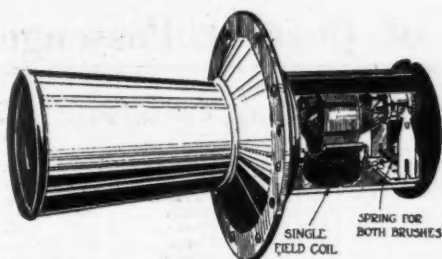


Detroit motor driven pump

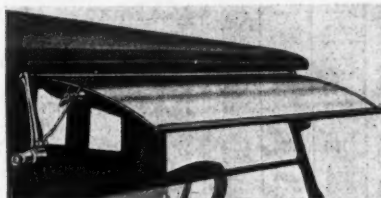
## BRIGGS AND STRATTON ELECTRIC HORN

By novel construction of the motor, the Briggs & Stratton Co., Milwaukee, has been able to use a single field coil in its new motor driven horn. The new construction has simplified the manufacture of the horn.

There is virtually no interior wiring of any kind. The fiber bearings make it unnecessary to lubricate the horn in any way. The new brush rigging makes it impossible for the brushes to stick. The brushes are not lubricated, as there is one carbon and one copper brush. By the design of the brush rigging with a single coil spring between the two brushes, which are mounted on a sub-assembly, equal pressure is always exerted on the brushes. The horn can be completely disassembled by removing two nuts. The adjustment of the horn can be made externally with the use of a screwdriver. Price \$5.



Briggs & Stratton electric horn



Herlth Visor

## GIER-LEWIS STEEL WHEEL

The center core of this wheel is cast into the radially corrugated disk, the pouring of the core into the disk making it an integral part of the hub casting. The outer circumference of the disk is welded into a standard steel felloe. This felloe will take either straight side or clincher rims. Motor Wheel Corp., Lansing, Mich.

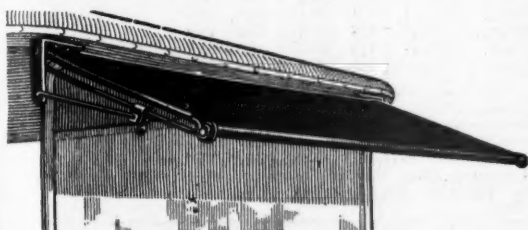
## HERLTH VISORS

The Herlth visors are made of light steel, electrically welded, highly finished in black baked enamel on outside with a flat green under side eliminating reflection. Universal clamp adjustable to any angle. Made of duralumin, non-rustable.

For all touring cars, \$8.50; Ford enclosed cars, \$5.00; Ford touring, \$6.00. The model illustrated is used on all touring cars.—O. B. Herlth Mfg. Co., 32 Union Place, Hartford, Conn.

## WEFCO SPRING COVER

The Wefco spring cover is made of leather and is fitted tightly about the spring, after a covering of grease has been applied for lubrication. The cover is hand-sewed with a special needle supplied with the cover. After the application of the lubricant to the spring, it is not necessary to remove the cover to further grease or oil the spring as the leather holds a certain amount of grease retaining power. The Wefco spring cover protects against rust and dust particles which work their way into the spring and take from its properties.—Wefco Co., 154 Nassau St., New York City.



Ward junior visor

## MOTOR AGE

## WARD JUNIOR VISOR

This visor, though light in weight, cannot be moved by wind or vibration. It is held in place by two side brackets, fastened to clamps by means of wing nuts which make it adjustable from the driver's seat. Two  $\frac{3}{8}$  in. steel rods extend from either end of the side brackets, stretching the covering material which is a good grade motor car topping, and the side brackets stretch it from end to end. All metal parts are finished with a high grade black motor car enamel, baked on to prevent rust. \$2.50. E. T. Ward Mfg. Co., Maywood, Ill.

## A C FORD SPARK PLUG

A new Ford spark plug, known as the "A C 1075 Special for Fords," has been brought out by the A. C. Spark Plug Co., Flint, Mich.

The porcelain of the A C 1075 plug is removable. It is girdled by six knife-edge ridges, which attain sufficient heat to burn off soot or carbon as fast as it forms, thus preventing "shorts." The exposed end of the porcelain is short and stocky to protect it against accident. The side electrode is rugged and shaped to form a natural oil drain.

## BENZER WIND DEFLECTORS

On this page of the February 16th issue of Motor Age the Benzer Wind Deflectors were described. The price given in that item was \$7. The wind Deflectors as illustrated is priced at \$25 and \$7 is the price of the replacement of the glass without the mirror.

## JOE PRIMER

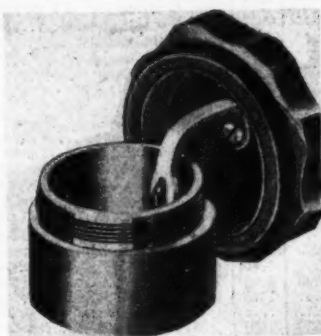
The Joe Primer can be installed on any car having an intake manifold that can be tapped. Various uses are assigned to this accessory, the chief use being easier starting in cold weather after installation. Price, \$2.50. J. C. Guter & Co., Waverly, Ia.

## RUST'S SAFETY FILLER CAPS

Rust's Safety Filler Caps feature a lock which is adjustable for putting water in radiator or gasoline in tank. Can be used on either the tank or radiator. Price \$3.00. Rust Mfg. Co., Marshalltown, Ia.

## PETRALYKE VISOR

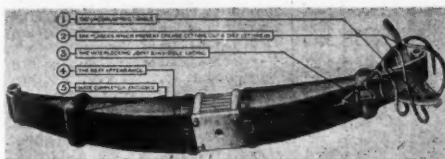
Petrallyke visors are constructed in various sizes, adjustable to any windshield. Petrallyke board is a composition which is set in a steel frame and is finished in dull black—Petrallyke Auto Visor Co., Appleton, Wis.



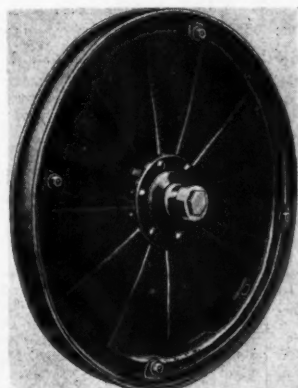
Rust's safety filler caps



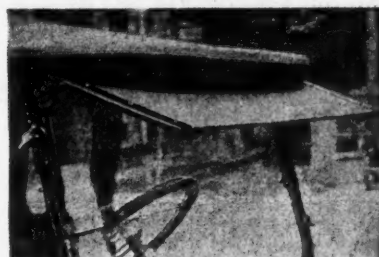
Joe primer



Wefco spring cover



Gier-Lewis steel wheel



Petrallyke visor



## Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan	NAME AND MODEL	Engine Make	Cylinders, Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ambassador.....R	Cont.	6-3 1/2 x 5 1/4	136	33x5	14500	14500	14500	14500	14500	Maxwell.....	Own.	4-3 1/2 x 4 1/2	109	31x4	\$ 885	\$ 885	1385	1485	
American.....C	U.S.	6-3 1/2 x 5	127	32x4	\$2195	2195	2250	3150	3150	McFarlan.....	1921	Own.	6-4 1/2 x 6	140	33x5	6300	6300	7500	7500
Anderson.....Series 40	Cont.	6-3 1/2 x 4 1/2	120	33x4	2195	1650	1795	2450	2550	Mercur.....	Series 5	Own.	4-3 1/2 x 4 1/2	132	32x4 1/2	3950	3950	4850	5250
Apperson.....8-21-S	Own.	8-3 1/2 x 5	130	34x4 1/2	2620	2615	3625	3695	3695	Merit.....	Cont.	6-3 1/2 x 4 1/2	119	32x4	1985	1985	1985	1985	
Auburn Beauty Six.....6-51	Cont.	6-3 1/2 x 4 1/2	121	32x4	1575	1575	1615	2275	2395	Meteor.....R & RR	Dues.	4-4 1/2 x 6	129	32x4 1/2	5500	5500	5500	5500	
Auburn Beauty Six.....	Cont.	6-3 1/2 x 4 1/2	121	32x4 1/2	12195	12195	12195	12195	12195	Mitchell.....F-50	Own.	6-3 1/2 x 5	120	33x4	11490	1490	1790	2440	
Beggs.....20T	Cont.	6-3 1/2 x 4 1/2	120	33x4	1775	1520	2320	2420	2420	Monroe.....1922-S-13	Own.	4-3 1/2 x 4 1/2	115	32x3 1/2	1295	1295	1295	1295	
Bell.....4-32	U.S.	4-3 1/2 x 5	114	31x4	1195	1195	1195	1195	1195	Monroe.....1922-S-14	Own.	4-3 1/2 x 4 1/2	115	33x4	1295	1295	1295	1295	
Bell.....6-50	U.S.	6-3 1/2 x 5	124	32x4	1545	1545	1545	1545	1545	Moore.....6-48	Cont.	6-3 1/2 x 4 1/2	122	32x4	1785	1785	2285	2785	
Biddle.....B1 & B5	Buda.	4-3 1/2 x 5 1/2	121	32x4	2050	12050	3950	3950	3950	Moore.....6-68	Cont.	6-3 1/2 x 5 1/2	125	32x4 1/2	2285	2285	2285	2285	
Brewster.....91	Own.	4-4 x 5 1/2	125	32x4 1/2	16000	6000	1295	1395	1395	Murray-Mac Six.....	Own.	6-3 1/2 x 5 1/2	128	34x4 1/2	4250	4250	4250	4250	
Buick.....1922-31-35-37	Own.	31x4	109	31x4	895	935	1295	1395	1395	Nash.....601-96-97	Own.	6-3 1/2 x 5	121	33x4	1390	1390	1540	1540	
Buick.....1922-41-5-6-7	Own.	6-3 1/2 x 4 1/2	118	33x4 1/2	1365	1395	1885	2165	2165	Nash.....602-94-95	Own.	6-3 1/2 x 5	127	34x4 1/2	1540	1540	2060	2390	
Buick.....1922-49-50	Own.	6-3 1/2 x 4 1/2	124	34x4 1/2	1785	1555	2075	2375	2375	Nash Four.....41-4	Own.	4-3 1/2 x 5	112	33x4	965	965	1485	1645	
Cadillac.....61	Own.	8-3 1/2 x 5 1/2	132	33x5	3100	3150	3150	3925	4100	National.....BB	Own.	6-3 1/2 x 5 1/2	130	32x4 1/2	2750	2750	3890	3990	
Cadillac.....X	Cont.	6-3 1/2 x 4 1/2	122	32x4 1/2	1890	1890	1890	2790	2790	Nema.....3C	Bea.	6-3 1/2 x 4 1/2	128	32x4 1/2	2100	2100	3200	3200	
Cadillac.....V	Cont.	6-3 1/2 x 5 1/2	126	34x4 1/2	1935	2585	2990	2990	2990	Nema.....1D	Cont.	6-3 1/2 x 5 1/2	128	32x4 1/2	3000	3100	3200	3200	
Chalmers.....1922	Own.	6-3 1/2 x 4 1/2	117	32x4	1245	1205	1395	1905	2205	Norwalk.....430-KS	Lye.	4-3 1/2 x 5	116	32x3 1/2	1035	1035	1035	1035	
Chalmers.....1922	Own.	6-3 1/2 x 4 1/2	122	32x4	1395	1395	1395	1395	1395	Oakland.....6-44	Own.	6-2 1/2 x 4 1/2	115	32x4	1120	1120	1120	1120	
Champion.....Tourist	Lye.	4-3 1/2 x 5	113	32x3 1/2	895	895	895	895	895	Ogren.....6 T De Luxe	Cont.	6-3 1/2 x 5 1/2	134	33x5	4250	4250	4350	5500	
Champion.....Special	U.S.	4-3 1/2 x 5	118	32x4	1095	1095	1095	1095	1095	Oldsmobile.....43-A	Own.	4-3 1/2 x 5 1/2	115	32x4	1145	1145	1645	1795	
Chandler.....Sta	Own.	6-3 1/2 x 5	123	33x4	1595	1595	1595	2295	2395	Oldsmobile.....46	Own.	8-2 1/2 x 4 1/2	122	33x4 1/2	1735	1735	2635	2635	
Chevrolet.....490	Own.	4-3 1/2 x 4	102	30x3 1/2	525	525	525	525	525	Oldsmobile.....47	Own.	8-2 1/2 x 4 1/2	115	32x4	1595	1595	2145	2295	
Chevrolet.....FB	Own.	4-3 1/2 x 4	110	32x4	975	975	1575	1575	1575	Overland.....4	Own.	4-3 1/2 x 4	100	30x3 1/2	550	550	850	895	
Cleveland.....41	Own.	6-3 1/2 x 4 1/2	112	32x4	1175	1195	1550	1595	1595	Packard.....Single Six	Own.	6-3 1/2 x 5	116	33x4 1/2	2350	2350	3125	3350	
Climber Four.....K	U.S.	4-3 1/2 x 5	115	33x4	1385	1385	1385	1385	1385	Packard.....Twin Six	Own.	12-3 x 5	136	35x5	3850	3850	5240	5400	
Climber Six.....S	H.S.	6-3 1/2 x 5	125 1/2	32x4 1/2	2250	2250	3000	3100	3100	Paige.....6-66	Cont.	6-3 1/2 x 5	110	32x4	1465	1465	1995	2245	
Cole.....890	Nort.	8-3 1/2 x 4 1/2	127 1/2	33x5	2485	2485	3185	3685	3685	Paterson.....22-6-52	Cont.	6-3 1/2 x 4 1/2	120	32x4 1/2	1550	1550	2595	2695	
Columbia Challenger.....	U.S.	6-3 1/2 x 5	115	32x4	1195	1195	1195	1195	1195	Pedersen.....56-S-7	Own.	8-3 1/2 x 5	125	34x4 1/2	2790	2790	3500	3790	
Columbia.....D-C&CS	Cont.	6-3 1/2 x 4 1/2	115	32x4	1475	1475	1475	2295	2350	Piedmont.....4-30	Lye.	4-3 1/2 x 5	116	32x3 1/2	970	970	970	970	
Comet.....C-53	Cont.	6-3 1/2 x 5 1/2	125	33x4 1/2	1985	2085	2985	2985	2985	Piedmont.....6-40	Cont.	6-3 1/2 x 4 1/2	122	32x4	1285	1285	1285	1285	
Crawford.....22-6-60	Cont.	6-3 1/2 x 5 1/2	122 1/2	32x4	3000	3000	3000	3000	3000	Pierce-Arrow.....	Own.	6-4 x 5 1/2	138	33x5	7000	6500	8000	8500	
Daniels.....D-19	Own.	8-3 1/2 x 5 1/2	132	34x4 1/2	15350	15350	6250	6050	6050	Pilot.....6-45	Teeter	6-3 1/2 x 5	120	32x4	1500	1500	1500	1500	
Davis.....71	Cont.	6-3 1/2 x 4 1/2	114	31x4	1195	1195	1195	1195	1195	Pilot.....6-50	H.S.	6-3 1/2 x 5	126	32x4 1/2	2050	2000	2950	3000	
Davis.....61-67	Cont.	6-3 1/2 x 4 1/2	120	33x4	1595	1595	1595	2095	2195	Porter.....46	Own.	4-4 1/2 x 6 1/2	142	35x5	6750	6750	7800	7800	
Dixie Flyer.....H-S-70	U.S.	4-3 1/2 x 5	112	32x4	1095	1095	1295	1545	1595	Premier.....6-D	Own.	6-3 1/2 x 5 1/2	126 1/2	33x5	3150	3100	3250	5000	
Dodge Brothers.....	Own.	4-3 1/2 x 4 1/2	114	32x4	850	880	1280	1440	1440	Premcar.....6-40 A	Falls.	6-3 1/2 x 4 1/2	117	32x4	1095	1095	1195	1750	
Dorris.....6-30	Own.	6-4 x 5	132	33x5	14785	4785	5800	7190	7190	R & V Knight.....R	Own.	4-3 1/2 x 5	116	32x4	1850	1850	2650	2750	
Dort.....19-14	D-Ly.	4-3 1/2 x 5	108	31x4	865	865	1315	1445	1445	R & V Knight.....J	Own.	6-3 1/2 x 5 1/2	127	32x4 1/2	2750	2750	3350	3450	
Driggs.....	Own.	4-2 1/2 x 4 1/2	104	30x3 1/2	1275	1275	1785	1785	1785	Reo Series.....B-T6 & U6	Own.	6-3 1/2 x 5	120	33x4	1595	1595	2355	2435	
Duesenberg.....Straight 8	Own.	8-2 1/2 x 5	134	33x5	6500	6500	6780	7800	7800	ReVer.....4-4 1/2 x 6	C.Dues.	4-4 1/2 x 6	131	32x4 1/2	3200	3200	4000	4000	
Du Pont.....A	Own.	4-3 1/2 x 5 1/2	124	32x4 1/2	3000	3200	3800	4000	4000	Rickenbacker.....A	Own.	6-3 1/2 x 4 1/2	117	32x4	1485	1485	1885	1985	
Du Pont.....A-22	Own.	4-3 1/2 x 4 1/2	109	31x4	890	890	1365	1365	1365	Roamer.....6-54-E	Cont.	6-3 1/2 x 4 1/2	128	32x4 1/2	2850	2535	2785	3850	
Durant.....B-22	Anst.	6-3 1/2 x 4 1/2	123	32x4 1/2	1600	1650	2250	2400	2400	Roamer.....4-75-E	Dues.	4-4 1/2 x 6	128	32x4 1/2	3985	3585	3750	4650	
Earl.....40	Own.	4-3 1/2 x 5 1/2	112	32x4	1485	1185	1895	1895	1895	Rolls-Royce.....	Own.	6-4 1/2 x 4 1/2	143 1/2	33x5	U.S. Chassis	11750	11750	11750	
Elcar.....K-4	Lye.	6-3 1/2 x 5	118	33x4	1095	1095	11095	1345	1345	Romer.....R-22	Cont.	6-3 1/2 x 4 1/2	120	32x4	1975	1975	2050	2700	
Elcar.....7-R	Cont.	6-3 1/2 x 4 1/2	118	33x4	1395	1395	1395	2065	2165	Saxon.....125	Own.	4-3 1/2 x 5	112	32x4	1195	1195	1795	1795	
Elgin.....K-1	Falls.	6-3 1/2 x 4 1/2	118	33x4	1345	1295	1345	2195	2195	Sayer Six.....DP	Cont.	6-3 1/2 x 4 1/2	118	33x4	1695	1695	2795	2795	
Estex.....	Own.	4-3 1/2 x 5	108 1/2	32x4	1095	1095	1345	1895	1895	Seneca.....L & O	L.R.	4-3 1/2 x 4 1/2	108	30x3 1/2	945	945	945	945	
Falcon, H.P.M.....12-D22	Own.	4-2 1/2 x 4	100	27x3 1/2	2800	13000	4000	4000	4000	Seneca.....50 & 51	Lye.	4-3 1/2 x 5	112	31x4	1095	1095	1095	1095	
Ferris.....Series 60	Cont.	6-3 1/2 x 5 1/2	130	32x4 1/2	2575	2575	2475	3475	3475	Southern Six.....660-2	U.S.	4-3 1/2 x 5	127	32x4 1/2	2375	2375	2365	2365	
Ferris.....Series 70	Cont.	6-3 1/2 x 5 1/2	130	32x4 1/2	2895	2895	2795	3595	3595	Sperling, A.....	Supr.	4-3 1/2 x 5	114	32x4	980	980	1685	1685	
Ford.....T	Own.	4-3 1/2 x 4	106	30x3 1/2	1919	1948	580	645	645	Standard.....J	Own.	8-3 1/2 x 5	127	32x4 1/2	2500	2500	3250	3500	
Franklin.....9-B	Own.	6-3 1/2 x 4	115	32x4	2400	2450	3200	3450	3450	Stanley Steamer.....	Own.	2-4 x 5	130	34x4 1/2	2800	2600	3775	3850	
Gardner.....T-R & G	Lye.	4-3 1/2 x 5	112	32x3 1/2	895	895	1595	1595	1595	Stanwood Six.....	Cont.	6-3 1/2 x 4 1/2	118	33x4	1765	1765	2750	2750	
Goodspeed.....	Own.	6-3 1/2 x 5 1/2	124	32x4 1/2	3985	3785	1895	1945	1945	Stearns.....SKL4	Own.	4-3 1/2 x 5 1/2	125	34x4 1/2	2250	2250	2450	3150	
Grant.....	Own.	6-3 1/2 x 4 1/2	110	32x4	1385	1385	1895	1945	1945	Stephens.....90	Own.	6-3 1/2 x 4 1/2	122	33x4 1/2	1675	1745	2650	2650	
H.C.S.....	Weid.	4-3 1/2 x 5 1/2	120	32x4 1/2	2725	12775	3450	3650	3650	Stevens-Duryea.....E	Own.	6-4 1/2 x 5 1/2	138	35x5	7250	6900	18900	18900	
Halladay.....4	Own.	4-3 1/2 x 5	115	32x4	1095	1095	1990	2095	2095	Studebaker.....Light Six	Own.	6-3 1/2 x 4 1/2	112	32x4	1045	1045	1375	1750	
Halladay.....6	Own.	4-3 1/2 x 5	115	32x4	1595	1595	2295	2395	2395	Studebaker.....Special Six	Own.	6-3 1/2 x 5	119	32x4	1425	1475	2145	2350	
Handley-Knight.....	Kn.Ht.	4-4 1/2 x 4 1/2	125	32x4 1/2	2650	2650	3450	3450	3450	Studebaker.....Big Six	Own.	6-3 1/2 x 5	126	33x4 1/2	2395	2395	2700	2700	

## Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES		Final Drive
				Front	Rear						Front	Rear						Front	Rear	
Acason, RB	1 1/2	\$1050	3 1/2 x 5	34x5 1/2	34x5 1/2	W	Commerce, 18	2 1/2	\$2495	4 1/2 x 5 1/2	36x6 1/2	36x7 1/2	1	Garford, 25	1 1/4	\$1990	3 1/2 x 5 1/2	36x3 1/2	36x4	W
Acason, RB	1 1/2	1950	3 1/2 x 5	36x3 1/2	36x6	W	Concord, A	2	3150	4 1/2 x 5 1/2	36x3 1/2	36x6	W	Garford, 70-H	2	2750	4 1/2 x 5 1/2	36x4	36x7	W
Acason, H	2 1/2	2750	4 1/2 x 5 1/2	36x4	36x8	W	Concord, B	3	3600	4 1/2 x 5 1/2	36x4	36x8	W	Garford, 77D	3 1/2	3750	4 1/2 x 5 1/2	36x5	36x6d	W
Acason, L	3 1/2	3450	5 x 6 1/2	36x5	36x10	W	Concord, AX	3	3250	4 1/2 x 5 1/2	36x3 1/2	36x6	W	Garford, 68D	5	4500	5 x 6 1/2	36x6	40x6d	W
Acason, M	5	4350	5 x 6 1/2	36x6	40x12	W	Concord, BX	3	3600	4 1/2 x 5 1/2	36x4	36x8	W	Garford, 150-A	7 1/2	5200	5x6 1/2	36x6	40x7d	W
Ace, C	1 1/2	2295	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Cook, 51	2 1/2	3600	4 1/2 x 5 1/2	36x6	40x8 1/2	1	Gary, F	1 1/2-1 3/4	2600	3 1/2 x 5 1/2	36x3 1/2	36x4	W
Ace, A	2 1/2	2795	4 1/2 x 5 1/2	36x4	36x7	W	Corbitt, E-22	1 1/2	1480	3 1/2 x 5 1/2	34x3 1/2	34x4	W	Gary, I	2	2900	4 x 5 1/2	36x3 1/2	36x5	W
Acme, G	1 1/2	.....	3 1/2 x 5	34x3 1/2	34x5	W	Corbitt, D-22	1 1/2	2200	3 1/2 x 5	34x3 1/2	34x4	W	Gary, J	2 1/2	3800	4 1/2 x 5 1/2	36x4	36x7	W
Acme, B	1	.....	3 1/2 x 5	34x3 1/2	34x5	W	Corbitt, C-22	2	2600	4 1/2 x 5 1/2	36x3 1/2	36x6	W	Gary, K	3 1/2	4900	4 1/2 x 5 1/2	36x5	40x5d	W
Acme, F	1 1/2	.....	3 1/2 x 5	34x3 1/2	34x5	W	Corbitt, B-22	2 1/2	3000	4 1/2 x 5 1/2	36x4	36x7	W	Gary, M	5	5900	5 x 6 1/2	36x6	40x6d	W
Acme, A	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x7	W	Corbitt, R-22	3	3200	4 1/2 x 5 1/2	36x4	36x8	W	Gersix, M	1 1/2	3100	4 x 5 1/2	36x3 1/2	36x7	W
Acme, AC	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x7	W	Corbitt, A-22	3 1/2-4	3800	4 1/2 x 5 1/2	36x5	36x10	W	Gersix, K	2 1/2	3500	4 1/2 x 5 1/2	36x4	36x8	W
Acme, C	3 1/2	.....	4 1/2 x 5 1/2	36x5	40x10	W	Corbitt, AA-22	5	4500	4 1/2 x 5 1/2	36x6	40x6d	W	Gersix	3 1/2	4500	4 1/2 x 5 1/2	36x5	40x12	W
Acme, E	5	.....	4 1/2 x 5 1/2	36x6	40x12	W	Day-Elder, AS	1	1600	3 1/2 x 5	35x5 1/2	35x5 1/2	W	Golden West, GH	3	4500	4 1/2 x 5 1/2	36x6	36x7	W
American, 25	2 1/2	3350	4 x 6	36x4	36x4d	W	Day-Elder, B	1 1/2	2000	3 1/2 x 5	34x3 1/2	34x5	W	Golden West, G	3 1/2	5000	4 1/2 x 5 1/2	36x6	36x6	W
American, 40	4	4275	4 1/2 x 6	36x5	36x5d	W	Day-Elder, D	2	2400	4 1/2 x 5 1/2	36x4	36x7	W	Graham Bros.	1-Ton	1265	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Apex, G	1	1450 1/2	3 1/2 x 5 1/2	33x5 1/2	33x5 1/2	1	Day-Elder, C	2 1/2	2750	4 1/2 x 5 1/2	36x4	36x7	W	Graham Bros.	1 1/2-Ton	1325	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Apex, D	1 1/2	1915	3 1/2 x 5 1/2	34x3 1/2	34x4	1	Day-Elder, F	3 1/2	3150	4 1/2 x 5 1/2	36x5	36x5d	W	Graham Bros.	1 1/2-Ton	1365	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Apex, E	2 1/2	2695	4 1/2 x 5 1/2	36x4	36x7	1	Day-Elder, E	5	4250	4 1/2 x 5 1/2	36x5	40x6d	W	Graham Bros.	1 1/2-Ton	1900	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Apex, F	3 1/2	3975	4 1/2 x 5 1/2	36x5	36x10	1	Dearborn, E	1	1600	3 1/2 x 5 1/2	35x5	35x5	W	Graham Bros.	1 1/2-Ton	2500	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Armleder, 20	1	.....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Dearborn, FX	1 1/2	2300	3 1/2 x 5 1/2	34x4	34x5	W	Graham Bros.	1 1/2-Ton	2925	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Armleder, 21	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x6	W	Dearborn, F	1 1/2	2180	3 1/2 x 5 1/2	34x4	34x5	W	Graham Bros.	1 1/2-Ton	3275	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Armleder, 40	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x6	W	Dearborn, 48	2	2590	3 1/2 x 5 1/2	34x4 1/2	34x7	W	Graham Bros.	1 1/2-Ton	4225	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Armleder, HW	2 1/2	.....	4 1/2 x 5 1/2	36x4	36x7	W	Defiance, D	1 1/2	1695	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	W	Graham Bros.	1 1/2-Ton	3995	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Armleder, KW	3 1/2	.....	4 1/2 x 5 1/2	36x5	36x5d	W	Defiance, D	1 1/2	2095	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	W	Graham Bros.	1 1/2-Ton	4895	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Atco, B	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Defiance, D	1 1/2	2275	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Atco, B1	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	DeMartini, 1 1/2	1 1/2	2600	3 1/2 x 5 1/2	34x3 1/2	34x6	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Atco, A	1 1/2	.....	3 1/2 x 5 1/2	34x3 1/2	34x5	W	DeMartini, 2	2	3300	4 x 5 1/2	36x3 1/2	36x7	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Atlas, M.D.	1	1185	3 1/2 x 5 1/2	32x4 1/2	32x4 1/2	1	DeMartini 3	3	4250	4 1/2 x 5 1/2	36x4	36x10	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Atterbury, 20R	1 1/2	2475	3 1/2 x 5 1/2	34x3 1/2	34x5	W	DeMartini 4	4	4800	4 1/2 x 5 1/2	36x5	36x12	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Atterbury, 7CX	2 1/2	3175	4 1/2 x 5 1/2	36x4	36x4d	W	Denby, 31	1 1/4	1485	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	B	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Atterbury, 7D	3 1/2	3975	4 1/2 x 5 1/2	36x5	40x5d	W	Denby, 33	1 1/4	2145	3 1/2 x 5 1/2	35x5 1/2	35x5 1/2	B	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Atterbury, 8E	5	4975	4 1/2 x 5 1/2	36x6	40x6d	W	Denby, 34	1 1/4	2295	3 1/2 x 5 1/2	36x3 1/2	36x6	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Autocar, 21UF	1 1/2-2	1950	4 1/2 x 5 1/2	34x3 1/2	34x5	D	Denby, 35	2 1/2-3	2795	3 1/2 x 5 1/2	36x4	36x7	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Autocar, 21UG	1 1/2-2	2030	4 1/2 x 5 1/2	34x3 1/2	34x5	D	Denby, 37	2 1/2-3	3895	4 1/2 x 5 1/2	36x5	36x5d	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Autocar, 27H	2	2930	4 x 5 1/2	34x5	36x7	D	Denby, 20	5	4295	4 1/2 x 5 1/2	36x6	40x6d	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Autocar, 27K2	2	3075	4 x 5 1/2	34x5	36x7	D	Dependable, A	3 1/2-4	1650	3 1/2 x 5 1/2	34x5	36x6	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Autocar, 26V	5	4100	4 1/2 x 5 1/2	36x6	40x6d	D	Dependable, C	1 1/2	2350	3 1/2 x 5 1/2	34x3 1/2	34x5	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Available, H1 1/2	1 1/2	2475	4 x 5 1/2	36x3 1/2	36x5	W	Dependable, D	2	2650	4 1/2 x 5 1/2	34x5	36x8	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Available, H2	2	2775	4 x 5 1/2	36x3 1/2	36x8	W	Dependable, E	2 1/2	2950	4 1/2 x 5 1/2	36x4	36x7	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Available, H2 1/2	2 1/2	3160	4 x 5 1/2	36x4	36x8	W	Dependable, G	3 1/2	3550	4 1/2 x 5 1/2	36x6	36x7	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Available, H3 1/2	3 1/2	4175	4 1/2 x 5 1/2	36x5	40x5d	W	Diamond T, O-3	1-1 1/2	1975	3 1/2 x 5 1/2	36x3 1/2	36x4 1/2	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Available, H5	5	5375	4 1/2 x 5 1/2	36x6	40x12	W	Diamond T, S	1 1/2	2525	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Avery	1	.....	3 x 4	34x5 1/2	34x5 1/2	1	Diamond T, F	1 1/2	2250	3 1/2 x 5 1/2	36x3 1/2	36x5	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Beck, A. Jr.	1	1950	3 1/2 x 5	34x3 1/2	34x4	1	Diamond T, U	2	2650	4 x 5 1/2	36x4	36x7	W	Graham Bros.	1 1/2-Ton	.....	3 1/2 x 4 1/2	33x4 1/2	34x5 1/2	B
Beck, C	2	2550	4 1/2 x 5 1/2	36x4	36x6	1	Diamond T, K	3 1/2	3											



## Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive
Kimball, AB	2 1/2	\$3675	4 x 6	36x4 36x7	W	O. K., M1	3 1/2	\$4250	4 1/2 x 6	36x5 36x5d	W	Signal, J	2 1/2	\$2875	4 1/2 x 5 1/2	34x4 36x8	W
Kimball, AC	2 1/2	3975	4 1/2 x 6	36x4 36x8	W	Ogden, D	1 1/2	....	3 3/4 x 5	36x3 1/2 36x5	W	Signal, M	3 1/2	3675	4 1/2 x 5 1/2	36x5 40x5d	W
Kimball, AE	3	4500	4 1/2 x 6	36x4 36x10	W	Ogden, D	1 1/2	....	3 3/4 x 5	36x3 1/2 36x5	W	Signal, R	5	4400	4 1/2 x 6	36x6 40x6d	W
Kimball, AF	4	5000	4 1/2 x 6	36x5 40x12	W	Ogden, E	2 1/2	....	4 1/2 x 5 1/2	36x4 36x8	W	Southern, 10	1	2000	3 3/4 x 5	31x3 1/2 34x4	W
Kimball, Express	5	5500	5 x 6	36x6 40x7d	W	Old Reliable, W	1	1775	3 3/4 x 5	36x3 1/2 36x4	W	Southern, 15	1 1/2	2590	3 3/4 x 5 1/2	36x6 34x4	W
Kissel, Utility	1 1/2	1935	3 1/2 x 5 1/2	34x5 34x5 1/2	W	Old Reliable, A	1 1/2	2350	4 x 5	34x4 36x6	W	Southern, 20	2	2090	4 1/2 x 5 1/2	36x6 40x8	W
Kissel, Freight	2 1/2	1975	3 1/2 x 5 1/2	36x3 1/2 36x5	W	Old Reliable, B	2 1/2	3500	4 1/2 x 6	34x4 36x4d	W	Standard, 1-K	1 1/2	1600	3 3/4 x 5	34x3 1/2 34x5	W
Kissel, H. D.	4	2675	4 1/2 x 5 1/2	36x4 36x7	W	Old Reliable, C	3 1/2	4250	4 1/2 x 6	36x5 36x5d	W	Standard, 76	2 1/2-3	2400	4 1/2 x 5 1/2	36x4 36x7	W
Kleiber, AA	1	2600	4 1/2 x 5 1/2	36x5 36x5d	W	Old Reliable, D	5	5250	4 1/2 x 6	36x6 40x6d	W	Standard, 66	3 1/2-5	3150	4 1/2 x 5 1/2	36x6 36x10	W
Kleiber, AB	1 1/2	3100	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Old Reliable, KLM	7	6000	4 1/2 x 6 1/2	36x6 40x7d	W	Standard, 5-K	5-7	4400	4 1/2 x 6	36x6 40x12	W
Kleiber, BB	2	3600	4 1/2 x 5 1/2	36x3 1/2 36x6	W	Oldsmobile Econ.	1	1005	3 1/2 x 5 1/2	35x5 1/2 35x5 1/2	I	Sterling, 1 1/2	1 1/2	2885	4 x 5 1/2	36x3 1/2 36x5	W
Kleiber, B	2 1/2	3950	4 1/2 x 5 1/2	36x4 36x7	W	Olympic, A	2 1/2	3200	3 1/2 x 5	36x4 36x8	W	Sterling, 2	2	3085	4 x 5 1/2	36x4 36x6	W
Kleiber, C	3 1/2	4600	4 1/2 x 5 1/2	36x5 36x5d	W	Oshkosh, A	2	3750	3 1/2 x 5	36x6 36x6 1/2	4	Sterling, 2 1/2	2 1/2	3290	4 1/2 x 5 1/2	36x4 36x4d	W
Kleiber, D	4	5300	5 x 6 1/2	36x6 40x12	W	Oshkosh, AA	2	3850	3 1/2 x 5	36x6 36x6 1/2	4	Sterling, 3 1/2	3 1/2	4325	4 1/2 x 5 1/2	36x5 40x5d	W
Koehler, R	1 1/2	1995	3 1/2 x 5	34x3 1/2 34x5	W	Oshkosh, B	2 1/2	4150	4 x 5 1/2	38x7 38x7 1/2	4	Sterling, 5-W	5	4950	5 x 6 1/2	36x6 40x6d	C
Koehler, M	2 1/2	3175	4 x 5 1/2	36x4 36x7	W	Oshkosh, BB	2 1/2	4300	4 x 5 1/2	38x7 38x7 1/2	4	Sterling, 5-C	5	5500	5 x 6 1/2	36x6 40x6d	C
Koehler, MCS	2 1/2	3275	4 x 5 1/2	36x4 36x7	W	Packard, EC	1 1/2-3	3100	4 1/2 x 5 1/2	36x4 36x7	W	Sterling, 7 1/2	7 1/2	6000	5 x 6 1/2	36x6 40x7d	C
Koehler, F	3 1/2	4150	4 1/2 x 5 1/2	36x5 36x10	W	Packard, EX	1 1/2-3	3100	4 1/2 x 5 1/2	36x4 36x7	W	Stewart, 14	3 1/2	1195	3 3/4 x 5 1/2	32x4 1/2 32x4 1/2	I
Koehler, MT, Trac	3 1/2	4275	4 1/2 x 5 1/2	36x4 36x7	W	Packard, ED	2 1/2-4 1/2	4100	4 1/2 x 5 1/2	36x5 36x5d	W	Stewart, 15	1 1/2	1395	3 3/4 x 5 1/2	35x5 1/2 35x5 1/2	I
Lange, B	2 1/2	3350	4 1/2 x 5 1/2	36x4 36x7	C	Packard, EF	4 1/2-7 1/2	4500	5 x 5 1/2	36x6 40x6d	W	Stewart, 9	1 1/2	1790	3 3/4 x 5	34x3 1/2 34x5	I
Larrabee, X-Z	2 1/2	1925	3 1/2 x 4 1/2	34x5 34x5 1/2	B	Paige, 52-19	1 1/2	1950	4 x 5 1/2	34x3 1/2 34x5	W	Stewart, 7	2	2090	4 1/2 x 5 1/2	34x4 34x7	I
Larrabee, U	1 1/2	2400	3 1/2 x 5	34x3 1/2 34x5	W	Paige, 54-20	2 1/2	2420	4 x 5 1/2	34x4 34x8	W	Stewart, 7-X	2 1/2	2290	4 1/2 x 5 1/2	34x4 34x7	I
Larrabee, K	1 1/2	3200	3 1/2 x 5	36x5 36x5d	W	Paige, 51-18	3 1/2	3145	4 1/2 x 5 1/2	36x5 36x5d	W	Stewart, 10	3 1/2	3090	4 1/2 x 5 1/2	36x5 36x5d	I
Larrabee, L-4	3 1/2	4000	4 1/2 x 5 1/2	36x5 36x5d	W	Parker, F20	2	3500	4 x 6	34x4 36x4d	W	Stewart, 10-X	3 1/2	3850	4 1/2 x 6	36x5 36x5d	I
Larrabee, W	5	4800	4 1/2 x 6	36x6 40x6d	W	Parker, J20	3 1/2	4400	4 1/2 x 6	36x5 40x5d	W	Stoughton, C	3 1/2	1240	3 1/2 x 5	34x4 1/2 34x4 1/2	W
Laedighaus, C	1	1690	3 1/2 x 5	35x5 1/2 35x5 1/2	W	Parker, M20	5	5500	4 1/2 x 6	36x6 40x6d	W	Stoughton, A	1	1995	3 1/2 x 5 1/2	34x4 1/2 34x4 1/2	W
Laedighaus, W	1 1/2	2490	3 1/2 x 5 1/2	34x3 1/2 34x5	W	Patriot, Reverse	1	1500	3 3/4 x 5	35x5 1/2 35x5 1/2	W	Stoughton, B	1 1/2	2350	3 3/4 x 5 1/2	36x3 1/2 36x5	W
Laedighaus, K	2 1/2-5	2790	4 1/2 x 5 1/2	36x4 36x7	W	Patriot, Lincoln	2	2050	4 x 5 1/2	34x3 1/2 34x5	W	Stoughton, D	2	2800	4 x 5 1/2	36x4 36x7	W
Maccari, L	1 1/2	2700	4 1/2 x 5 1/2	36x4 36x6	W	Patriot, Wash'n	3	2900	4 1/2 x 5 1/2	36x4 36x7	W	Stoughton, F	3	3600	4 1/2 x 5 1/2	36x5d 36x5d	W
Maccari, H-A	2	3100	4 1/2 x 5 1/2	36x4 36x4d	W	Piedmont, 4-30	1	1200	3 1/2 x 5	34x4 34x4 1/2	W	Sullivan, E	2	2800	4 1/2 x 5 1/2	36x4 36x7	W
Maccari, H-2	3	3400	4 1/2 x 5 1/2	36x4 36x5d	W	Pierce-Arrow	2	3200	4 x 5 1/2	36x4 36x4d	W	Sullivan, H	3 1/2	3750	4 1/2 x 6	36x5 36x5d	W
Maccari, H-3	4	4200	4 1/2 x 5 1/2	36x5 36x6d	W	Pierce-Arrow	3 1/2	4350	4 1/2 x 5 1/2	36x5 36x5d	W	Superior, D	1	1650	3 3/4 x 5	34x4 1/2 34x4 1/2	I
Maccari, G	5-6	4950	5 x 6 1/2	36x6 40x6d	W	Pioneer, 59	5	4850	4 1/2 x 5 1/2	36x5 40x6d	W	Superior, E	2	2600	4 1/2 x 5 1/2	36x4 36x6	I
MacDonald, A	7 1/2	6750	5 x 6 1/2	40x7 40x14	I	Pittsburgher	1 1/2-2	3000	3 3/4 x 5	36x4 36x6	W	Super Truck, 50	2 1/2	3300	4 x 6	36x4 36x8	W
Mac, AB D.R.	1 1/2	3450	4 x 5	36x4 36x3 1/2	D	Pittsburgher	3	3800	4 1/2 x 5 1/2	36x5 36x8	W	Super Truck, 70	3 1/2	4300	4 1/2 x 6	36x5 40x5d	W
Mac, AB Chain	1 1/2	3000	4 x 5	36x4 36x3 1/2	C	Power, C	2	3150	4 1/2 x 5 1/2	36x5 36x7	W	Super Truck, 100	5	5300	4 1/2 x 6	36x5 40x12	W
Mac, AB Chain	2	3300	4 x 5	36x4 36x4d	C	Power, F	3 1/2	4250	4 1/2 x 5 1/2	36x5 40x10	W	Super Truck, 150	7 1/2	6300	5 x 6	36x6 40x7d	W
Mac, AB D.R.	2 1/2	3750	4 x 5	36x4 36x4d	D	Premcar, B-143	1 1/2	2475	3 1/2 x 5	36x6 36x6 1/2	W	Texas, A39	3 1/2	1095	3 3/4 x 5	33x4 33x4	I
Mac, ABD	2 1/2	3850	4 x 5	36x4 36x4d	D	Rainier, R-21	1 1/2	1990	3 1/2 x 5	35x5 1/2 35x5 1/2	W	Texas, TK39	1 1/2	1550	3 3/4 x 5	36x6 38x7	W
Mac, AB Chain	2 1/2	3400	4 x 5	36x4 36x4d	C	Rainier, R-19	1	2150	3 1/2 x 5	34x3 1/2 34x4	W	Thorn Speed T/L	1 1/2	1795	4 x 5 1/2	34x5 34x5	B
Mac, AB Chain	3 1/2	4950	5 x 6	36x5 40x5d	C	Rainier, R-16	1 1/2	2490	3 1/2 x 5	34x3 1/2 34x5	W	Tiffin, GW	1 1/2	2100	4 1/2 x 5 1/2	36x3 1/2 36x5	W
Mac, AB Chain	5	5500	5 x 6	36x6 40x6d	C	Rainier, R-18	2	2890	4 1/2 x 5 1/2	34x4 34x6	W	Tiffin, MW	2 1/2	2700	4 1/2 x 5 1/2	36x4 36x3 1/2	W
Mac, AB Chain	6 1/2	5750	5 x 6	36x6 40x12	C	Rainier, R-20	2 1/2	3550	4 1/2 x 5 1/2	34x4 34x7	W	Tiffin, PW	3 1/2	3600	4 1/2 x 5 1/2	36x5 40x5d	W
Mac, AB Chain	7 1/2	6000	5 x 6	36x7 40x7d	C	Rainier, R-15	3 1/2	4400	4 1/2 x 5 1/2	36x5 36x5d	W	Tiffin, F50	5	4300	4 1/2 x 6	36x6 40x6d	W
Mac, AB Chain	8	6400	5 x 6	36x7 40x7d	C	Rainier, R-17	5	5100	4 1/2 x 5 1/2	36x6 36x6d	W	Tiffin, F60	6	4500	4 1/2 x 6	36x6 40x12	W
Mac, Trac, AB	7	4950	5 x 6	36x6 40x5d	C	Rainier, R-17	5	5100	4 1/2 x 5 1/2	36x6 36x6d	W	Titan	2	2050	4x5 1/2	34x4 36x7	I
Mac, Trac, AC	10	5500	5 x 6	36x6 40x6d	C	Ranger, TK-22-2	2	2775	3 3/4 x 5	36x6 38x7 1/2	W	Titan	3 1/2	3950	4 1/2 x 5 1/2	36x5 40x10	I
Mac, Trac, AC	13	5750	5 x 6	36x6 40x12	C	Reo, F	3 1/2-11	1245	4 1/2 x 5 1/2	34x4 1/2 34x4 1/2	B	Titan	5	4550	4 1/2 x 6	36x5 40x6d	I
Mac, Trac, AC	15	6000	5 x 6	36x7 40x7d	C	Reliance, 10A	1 1/2	2400	4 x 5 1/2	36x3 1/2 36x5	I	Titan, 6-Ton	6	5150	4 1/2 x 6	36x5 40x12	I
Mapleleaf, AA	2	3775	4 x 5 1/2	36x4 36x7	W	Reliance, 20B	2 1/2	3100	4 1/2 x 5 1/2	36x4 36x4d	I	Tower, J	1 1/2	2900	4 1/2 x 5 1/2	35x5 38x7	W
Mapleleaf, BB	3	4350	4 1/2 x 5 1/2	36x4 36x4d	W	Republic, 75	3 1/2	1395 1/2	3 1/2 x 5	32x4 1/2 32x4 1/2	I	Tower, H	2 1/2	3200	4 1/2 x 5 1/2	36x4 36x7	W
Mapleleaf, CC	4	5100	4 1/2 x 5 1/2	36x5 36x5d	W	Republic, 10	1	1395	3 1/2 x 5	34x3 34x4	I	Tower, G	3 1/2	4100	4 1/2 x 5 1/2	36x5 36x5d	W
Mapleleaf, DD	5	6200	4 1/2 x 5 1/2	36x6 40x6d	W	Republic, 10Exp.	1	1605	3 1/2 x 5	35x5 1/2 34x5 1/2	I	Traffic, C	3	1595	3 3/4 x 5	34x3 1/2 34x5	I
Master, JW	1 1/2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Republic, 11X	1 1/2	1795	3 1/2 x 5	34x3 1/2 34x6	I	Traffic	3	1895	3 3/4 x 5	34x3 1/2 34x5	I
Master, JD	1 1/2	2590	4 1/2 x 5 1/2	34x3 1/2 34x5	D	Republic, 19	2 1/2	2195	4 1/2 x 5 1/2	36x4 36x7	I	Transport, 20	1	1395	3 3/4 x 5	34x3 1/2 34x4	I
Master, Z	2	2290	4 1/2 x 5 1/2	34x3 1/2 34x5	W	Republic, 20	3 1/2	3095	4 1/2 x 5 1/2	36x5 36x10	I	Transport, 30	1 1/2	1995	3 3/4 x 5	36x3 1/2 36x5	I
Master, W	2 1/2	2890	4 1/2 x 5 1/2	34x4 36x7	W	Rowe, CW	1 1/2	3000	3 1/2 x 5	36x6 36x6 1/2	W	Transport, 50	2 1/2	2785	4 1/2 x 5 1/2	36x4 36x7	I
Master, DD	2 1/2	3190	4 1/2 x 5 1/2	34x4 36x7	D	Rowe, C. D. W.	2	3300	4 x 5	34x4 36x3 1/2	W	Transport, 70	3 1/2	3885	4 1/2 x 6	36x5 36x10	I
Master, A	3 1/2	3990	4 1/2 x 6	36x5 40x5d	D	Rowe, G. S. W.	3	4150	4 x 6	34x5 36x5d	W	Traylor, B	1 1/2	2390	3 3/4 x 5 1/2	34x3 1/2 34x5	W
Master, E	3 1/2	4290	4 1/2 x 6	36x5 40x5d	D	Rowe, G. P. W.	3	5250	3 1/2 x 5 1/2	38x7 42x9 1/2	W	Traylor, C	2	2850	4 x 5 1/2	36x4 36x7	W
Master, Y	4	4490	4 1/2 x 6	36x5 40x6d	D	Rowe, HW	4	4500	4 1/2 x 6	36x5 36x6d	W	Traylor, D	3	2300	4 1/2 x 5 1/2	36x4 36x8	W
Master, B	5	4990	4 1/2 x 6	36x6 40x6d	D	Rowe, F. W.	5	5500	4 1/2 x 6	36x6 40x6d	W	Traylor, E	4	4450			

## Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive	NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front Rear	Final Drive
Walter, S	5	\$4850	4 1/2 x 6 1/2	36x6 40x6d	W	Wichita, RX	3	\$3500	4 1/2 x 6 1/2	36x4 38x8	W	Winther, 430	1 1/2	\$2850	3 1/2 x 5	32x4 32x4	I
Ward-LaF., 2B	2 1/2	2900	4 1/2 x 6 1/2	36x4 36x4d	W	Wichita, O	4	3900	4 1/2 x 6 1/2	38x5 38x5d	W	Winther, 39	1 1/2	2450	3 1/2 x 5	34x3 1/2 34x5	I
Ward-LaF., 4A	3 1/2	3990	4 1/2 x 6 1/2	36x5 36x5d	W	Wilcox, AA	1	1900	3 1/2 x 5 1/2	38x4 38x4	W	Winther, 49	2	3250	4 x 5	34x4 34x4d	I
Ward-LaF., 5A	5	4590	5 x 6 1/2	36x6 40x6d	W	Wilcox, BB	1 1/2	2550	4 1/2 x 5	38x4 38x5	W	Winther, 50	2 1/2	3995	4 x 6	38x7 1/2 42x9 1/2	I
Watson, B	1	1635	3 1/2 x 5 1/2	36x5 35x5 1/2	W	Wilcox, D	2 1/2	3000	4 1/2 x 5	38x4 38x4 1/2	W	Winther, 70	3 1/2	4 00	4 x 6	38x5 38x5d	I
Watson, N	3 1/2	3825	4 1/2 x 5 1/2	36x5 36x10	W	Wilcox, E	3 1/2	3950	4 1/2 x 6	38x5 38x5d	W	Winther, 450	5	5250	4 x 6	38x6 38x6	I
Western, W 1 1/2	1 1/2	2550	4 1/2 x 5 1/2	36x3 1/2 36x5	W	Wilcox, F	5	4350	4 1/2 x 6 1/2	38x5 40x6d	W	Winther, 109	5	5250	4 1/2 x 6	38x6 40x6d	I
Western, W 1 1/2	1 1/2	2550	4 1/2 x 5 1/2	36x3 1/2 36x5	W	Wilson, EA	1 1/2	2270	3 1/2 x 5	36x3 1/2 36x5	W	Winther, 140	7	5900	5 x 6	38x6 40x7d	W
Western, W 2 1/2	2 1/2	3250	4 1/2 x 5 1/2	36x4 38x7	W	Wilson, F	2 1/2	2825	4 1/2 x 5 1/2	36x4 38x7	W	Wisconsin, B	1	1750	3 1/2 x 5	38x5 38x5	W
Western, W 2 1/2	2 1/2	3250	4 1/2 x 5 1/2	36x4 38x7	W	Wilson, G	3 1/2	3685	4 1/2 x 5 1/2	38x5 38x5	W	Wisconsin, C	1 1/2	2500	4 x 5 1/2	38x6 38x6	W
Western, W 3 1/2	3 1/2	4250	4 1/2 x 6	36x5 40x6d	W	Wilson, H	5	4520	4 1/2 x 6	38x6 40x6	W	Wisconsin, F	2	3000	4 1/2 x 5 1/2	38x7 40x8	W
White, 15	2 1/2	2400	3 1/2 x 5 1/2	34x5 1/2 34x5 1/2	D	Winther, 751	1	1795	3 1/2 x 5	34x4 1/2 35x5	I	Wisconsin, D	2 1/2	3500	4 1/2 x 6 1/2	38x6 38x10	W
White, 20	2	3250	3 1/2 x 5 1/2	34x5 1/2 34x5 1/2	D							Wisconsin, C	3 1/2	4000	5 x 6 1/2	38x6 38x12	W
White, 40	3 1/2	4200	4 1/2 x 5 1/2	36x6 40x6d	D							Witt-Will, N	1 1/2	2250	3 1/2 x 5	36x3 1/2 36x5	W
White, 45	5	4500	4 1/2 x 5 1/2	36x6 40x6d	D							Witt-Will, P	2 1/2	2750	4 1/2 x 5 1/2	38x7 38x7	W
White Hick., E	1	1225	3 1/2 x 5	34x5 1/2 34x5 1/2	W							Wolverine, J	1	2125	3 1/2 x 5	34x3 34x4	I
White Hick., H	1 1/2	1375	3 1/2 x 5	36x3 1/2 36x5	W							Wolverine, J	1 1/2	2375	3 1/2 x 5	34x3 1/2 34x5	I
White Hick., K	2 1/2	1675	4 1/2 x 5 1/2	36x4 36x5	W							Wolverine, J	2	2640	3 1/2 x 5	34x4 34x7	I
Wichita, K	1	2000	3 1/2 x 5 1/2	36x3 36x4	W							Wolverine, J	2 1/2	3425	4 1/2 x 5 1/2	38x5 38x10	I
Wichita, M	3	2500	3 1/2 x 5 1/2	36x3 1/2 36x6	W							Wolverine, L	3 1/2	4100	4 1/2 x 5 1/2	38x5 38x10	I

\*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl.  
 Trac. Tractor. \*\*Canadian made.  
 Final Drive: W—Worm, I—Internal Gear, C—Chain, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. †Tires—optional. ‡Pneumatic Tires. All others solid.  
 †Price includes body. ‡—Price includes several items of equipment.

## Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity	TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Flow Capacity			
All-In One	15-30	\$1975	3	Weid.	4-4 x 5 1/2	GDK	2-3	Frick	12-20	.....	4	Erd.	4-4 x 6	G,K	2-3	Pioneer	40-75	\$3550	4	Own	4-7 x 8	Gas.	10			
Allis-Chalm. B	6-12	.....	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Frick	15-25	.....	4	Beav.	4-4 1/2 x 6	G,K	3-4	Flowman	15-30	1295	4	Buda	4-4 1/2 x 6	G,K	3-4			
Allis-Chalm. G.P.	15-25	1350	2	Midw.	4-4 1/2 x 5 1/2	Gas.	1	Grain Belt	18-36	\$2150	4	Wauk.	4-4 1/2 x 6 1/2	G or K	4	Port Huron	12-25	1500	4	Chief	4-3 1/2 x 6	G,K	3			
Allis-Chalm. 20-35	1885	.....	4	Own	4-4 1/2 x 6 1/2	GorK	3-4	Gray	18-36	2000	3	Wauk.	4-4 1/2 x 6 1/2	G,K	4											
Allis-Chalm. 20-35	2085	.....	4	Own	4-4 1/2 x 6 1/2	GorK	3	Ground Hog	19-31	2000	4	Erd.	4-4 x 6	G or K	3											
Allwork	14-28	1695	4	Own	4-4 1/2 x 6	GorK	3	Gt. Western St	20-30	1950	4	Beav.	4-4 1/2 x 6	K	4	Ranger Cul.	8-16	.....	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1			
Allwork	14-28	1395	4	Own	4-5 x 6	GorK	3									T-20	10-20	685	4	Own	2-6 x 7	Ker.	2			
Andrews	18-36	2500	4	Clim.	4-5 x 6 1/2	GorK	4	Hart-Parr	20	945	4	Own	2-5 1/2 x 6 1/2	K,D	2	Reliable	10-20	1600	4	Wauk.	4-4 1/2 x 5 1/2	G or K	3			
Appleton	12-20	1500	4	Buda	4-4 1/2 x 5 1/2	G,K	2-3	Hart-Parr	30	1295	4	Own	2-6 1/2 x 7	K,D	3	Rex	12-25	1600	4	Own	4-4 1/2 x 5 1/2	G or K	3			
ARO	3-5	385	4	Own	1-4 1/2 x 5	Gas.	1	Heider	9-16	870	4	Wauk.	4-4 1/2 x 6 1/2	G,K	2	Russell	12-24	1500	4	Own	4-4 1/2 x 6 1/2	G or K	2-3			
Aultman-T	15-30	2200	4	Clim.	4-5 x 6 1/2	G,K	4	Heider	12-20	900	4	Wauk.	4-4 1/2 x 6 1/2	G,K	3	Russell	15-30	2200	4	Own	4-5 x 6 1/2	G or K	3-4			
Aultman-T	22-45	3420	4	Own	4-5 1/2 x 6	G,K	6	Heider	5-10	800	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1	Russell	20-35	3000	4	Own	4-5 1/2 x 7	G or K	4-5			
Aultman-T	30-60	4500	4	Own	4-7 x 9	G,K,D	8-10	Huber Light	12-25	1185	4	Wauk.	4-4 1/2 x 6 1/2	G or K	3											
Automot. B-3	12-24	1785	4	Herec.	4-4 x 5 1/2	Gas.	2-3	Huber Super	15-30	1885	4	Midw.	4-4 1/2 x 6	Gas	3											
Avery	5-10	.....	4	Own	4-3 x 4	G,K	2									Samson	.....	445	4	Own	4-4 x 5 1/2	G,K	2			
Avery	5-10	.....	3	Own	6-3 x 4	G,K	2	Illinois Super	15-30	.....	4	Clim.	4-5 x 6 1/2	G,K	4	Sandusky	10-20	1250	4	Own	4-4 1/2 x 5 1/2	G,K,D	2			
Avery	5-10	.....	4	Own	4-3 x 4	G,K	2	Imperial	40-70	4500	4	Own	4-7 1/2 x 9	G,K,D	10	Sandusky	15-35	1750	4	Own	4-5 x 6 1/2	G,K,D	4			
Avery	8-16	.....	4	Own	2-5 1/2 x 6	G,K,D	2-3	Indiana	15-25	665	2	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2	Shelby	15-30	.....	4	Beav.	4-4 1/2 x 6	G,K	3			
Avery	12-20	.....	4	Own	4-4 1/2 x 6	G,K,D	3-4	International	8-16	1670	4	Own	4-4 1/2 x 5	G,K,D	2	Shelby	9-18	.....	4	Wauk.	4-3 1/2 x 5 1/2	G or K	2			
Avery	12-25	.....	4	Own	4-4 1/2 x 6	G,K,D	3-4	Internat. Titan	10-20	1700	4	Own	4-5 1/2 x 8	G,K,D	4	Short Turn	20-40	1500	3	Beav.	4-4 1/2 x 6	G,K	3			
Avery	14-28	.....	4	Own	2-6 1/2 x 7	G,K,D	3-4	International	15-30	1500	2	Own	4-4 1/2 x 6	G,K,D	3	Steady Pull	12-24	1485	4	Own	4-4 x 5	Gas.	3			
Avery	18-36	.....	4	Own	4-5 1/2 x 6	G,K,D	4-5	J-T	20-40	.....	2	Chief	4-4 1/2 x 6	G,K,D	3-4	Stinson	18-36	1835	4	Beav.	4-4 1/2 x 6	G,K	4			
Avery	25-50	.....	4	Own	4-6 1/2 x 7	G,K,D	5-6	Klumb	18-32	1475	4	Clim.	4-5 x 6 1/2	Gas	4	Tiga	15-27	1985	4	Wise.	4-4 1/2 x 6	Gas.	3-4			
Avery	45-65	.....	4	Own	4-7 1/2 x 8	G,K,D	8-10	Knuelsen	25-45	2500	4	Own	4-5 1/2 x 9	Gas	4-6	Topp	.....	.....	.....	.....	.....	.....	.....			
Bates	15-25	.....	4	Own	4-4 1/2 x 6	Ker.	3	LaCrosse	6-12	650	4	Own	2-4 x 6	G,K	1	Stewart	30-45	3500	4	Wauk.	4-4 1/2 x 6 1/2	Gas.	3-4			
Bates Mule	15-25	.....	4	Midw.	4-4 1/2 x 5 1/2	Gas.	3	LaCrosse	12-24	985	4	Own	2-6 x 7	G or K	3	Toro Cultivator	6-10	750	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2			
Bates Mule	18-25	.....	2	Midw.	4-4 1/2 x 5 1/2	Gas.	3	Lauson	12-25	1495	4	Midw.	4-3 1/2 x 4 1/2	Gas.	3	Toro Tractor	10-20	495	3	LeR.	4-3 1/2 x 4 1/2	Gas.	2			
Bates Mule	25-35	.....	2	Midw.	4-4 1/2 x 6	Gas.	3	Lauson	20-25	1885	4	Beav.	4-4 1/2 x 6	G or K	3-4	Townsend	15-30	1350	2	Own	4-4 1/2 x 6 1/2	Ker.	2-3			
Boeman	2-4	240	4	Own	1-3 1/2 x 4 1/2	Gas.	1	Lauson	21	1530	4	Beav.	4-4 1/2 x 6	G or K	3-4	Townsend	25-50	2500	2	Own	4-8 x 10	Ker.	4-8			
Best	18-30	3100	2	Own	4-4 1/2 x 6 1/2	G,K,D	4	Lauson Road	15-30	2225	4	Beav.	4-4 1/2 x 6	K	3-4	Traction Motor	40-50	.....	4	.....	8-3 1/2 x 5	Gas.	4-5			
Best	60	5450	2	Own	4-6 1/2 x 8 1/2	G,K,D	8-9	Leader	12-18	685	4	Own	2-6 x 8 1/2	G,K,D	2-3	Traylor	6-12	715	4	LeR.	4-3 1/2 x 4 1/2	Gas.	1-2			
Boring	1921	1850	3	Wauk.	4-4 1/2 x 6 1/2	GorK	2	Leader	16-32	1725	4	Clim.	4-5 x 6 1/2	G,K	3-4	Triumph	18-36	2450	2	Erd.	4-4 1/2 x 6	Ker.	4			
Burn-Oil	1922	1435	4	Own	2-6 1/2 x 7	Ker.	3-4	Leader	18-36	2150	2	Clim.	4-5 x 6 1/2	G,K	3-4	Trundar	25-40	3750	2	Wauk.	4-5 x 6 1/2	G or K	4			
Capital	15-30	1000	2	Own	4-4 1/2 x 6	Gas.	3	Leonard	20-30	2530	4	Buda	4-4 1/2 x 6	G,K	3	Turner	12-25	1295	4	Buda	4-4 1/2 x 6 1/2	G,K	3			
Case	10-18	700	4	Own	4-3 1/2 x 5 1/2	GorK	2	Linn	40	4500	2	Cont.	4-4 1/2 x 6 1/2	Gas	4	Twin City	14-20	1395	4	Own	4-4 1/2 x 6	G,K	3			
Case	15-27	1420	4	Own	4-4 1/2 x 6	GorK	3-4	Linn	60	5000	2	Wauk.	4-5 x 6 1/2	K	6	Twin City	20-35	2950	4	Own	4-5 1/2 x 6 1/2	G,K	3			
Case	22-40	2550	4	Own	4-5 1/2 x 6 1/2	GorK	4-5	Little Giant	16-22	2200	4	Own	4-5 1/2 x 6	K	6	Twin City	40-65	4750	4	Own	4-7 1/2 x 9	G,K	8			
Case	40-72	.....	4	Own	7 x 8	G,K,D	8-10	Little Giant	26-35	3300	4	Own	4-5 1/2 x 6	K	6	Uncle Sam	12-20	1385	4	Weid.	4-4 x 5 1/2	G	2-3			
Caterpillar T11	25	3975	2	Own	4-4 1/2 x 6	Gas.	6	Lombard	1921	85-150	.....	2	6-5 1/2 x 6 1/2	Gas.	16	Uncle Sam B19	20-30	2300	4	Beav.	4-4 1/2 x 6	G or K	3-4			
Caterpillar T16	40	6050	2	Own	4-4 1/2 x 6	Gas.	6	Lombard	1921	50	.....	2	4-4 1/2 x 6 1/2	Gas.	6-10	Uncle Sam D21	20-30	1985	4	Beav.	4-4 1/2 x 6	G or K	3-4			
Centaur	5-2 1/2	358		N Wauk.	2-4 1/2 x 7	GorK	1	Magnet	14-28	1875	4	Wauk.	2-4 1/2 x 6 1/2	K&G	3	Universal	1-4	475	2	Own	1-3 1/2 x 4 1/2	G	1			
Chase	12-26	1725	3	Buda	4-4 1/2 x 5 1/2	GorK	2-3	Master Jr.	5-10	585	.....	LeR.	-2 1/2 x 4	Gas.	1	Utilitor	501	295	4	Own	1-3 1/2 x 4 1/2	G	1			
Chicago	40	2500	4	Own	4-4 1/2 x 6	Gas.	4	Merry Gar1922	2	210	2	Evin	1-2 1/2 x 2 1/2	Gas.	3											
Cletrac	F	9-16	795	2	Own	4-3 1/4 x 4 1/2	G,K,D	2	Minne.	12-25	900	4	Own	4-4 1/2 x 7	G or K	3	Wim.	15-30	1190	4	Wauk.	4-4 1/2 x 5 1/2	G,K	3		
Cletrac	W	12-20	1345	2	Own	4-4 x 5 1/2	G,K,D	2-3	Minne.	17-30	1675	4	Own	4-4 1/2 x 7	G or K	3-4	Wallis	15-25	1995	4	Own	4-4 1/2 x 5 1/2	G,K	3		
Dakota	4	15-27	1500	3	Donn.	4-4 1/2 x 6	Gas.	3	Med.Duty	22-44	3000	4	Own	4-6 x 7	G or K	5-6	Waterloo	N	12-25	675	4	Own	2-6 1/2 x 7	G,K	3	
Dart	B.J.	15-30	1800	4	Buda	4-4 1/2 x 6	Gas.	3-4	Minne.							Webfoot	53	28-53	5000	2	Wisc.	4-5 1/2 x 7	G,D	6		
Dodge	A	20-30	2500	4	Buda	4-4 1/2 x 6	Gas.	4	Heavy Duty	35-70	4150	4	Own	4-7 1/2 x 9	G or K	8-9	Wellington	B	12-22	.....	4	Erd	4-4 x 6	Ker.	2-3	
Dill	D	20	2380	4	Cont.	4-4 1/2 x 5 1/2	Gas.	4	Mohawk 1921	8-10	785	2	Light	4-3 1/2 x 4 1/2	K or G	1-2	Wellington	F	16-30	.....	4	Chief	4-4 1/2 x 6	Ker.	3-4	
Dill	R.W.	20	2980	4	Midw.	4-4 1/2 x 6	Gas.	3	Moineur Dv	9-18	900	2	Own	4-3 1/2 x 5	Gas.	2-3	Western	1920	16-32	2100	4	Clim.	4-6 x 6 1/2	Gas.	4	
Do-It-All	A	3-6	595	.....	1-4 1/2 x 5	Gas.	1	Moineur Orch.	9-18	900	2	Own	4-3 1/2 x 5	Gas.	2-3	Wetmore	21-22	12-25	1185	4	Wauk.	4-4 x 6	G,K	3		
Eagle	F	12-22	.....	4	Own	2-7 x 8	GorK	3-4	Motor Macult.	1 1/2	195	2	Own	1-2 1/2 x 3 1/2	Gas.	2	Whitney	9-18	595	2	Own	2-5 1/2 x 6 1/2	Gas.	2		
Eagle	F	16-30	.....	4	Own	2-8 x 8	GorK	4-5	Motor	15-30	2250	4	Buda	4-4 1/2 x 6	Gas.	3-4	Wichita	T	15-30	2500	4	Beav.	4-4 1/2 x 6	G,K,D	3-4	
E-B	AA	12-20	1095	4	Own	4-4 1/2 x 6	G,K,D	3	Motor	3-6	425	4	Own	2-3 1/2 x 4	Gas.	1	Wisconsin	E	16-30	1850	4	Clim.	4-5 x 6 1/2	G or K	3	
E-B	Q	12-20	750	4	Own	4-4 1/2 x 6	G,K,D	3	NB	20-42	2650	4	Own	8 x 10	G or K	3-6	Wisconsin	F	20-40	2550	4	Wauk.	4-5 x 6 1/2	G or K	4	
E-B	Q	16-32	1750	4	Own	4-5 1/2 x 7	G,K,D	4	Nichols	25-50	3000	4	Own	9 x 12	G or K	4-7	Wisconsin	H	22-40	2050	4	Clim.	4-5 1/2 x 7	G or K	4-6	
Evans	18-30	2000	4	Buda	4-4 1/2 x 6	G,K	3	Nichols	25-50	3000	4	Own	9 x 12	G or K	4-7	Yuba	15-25	3100	2	Wisc.	4-4 1/2 x 6	G,K,D	3			
Fagool	D	9-18	1525	4	Lyc.	4-3 1/2 x 5	Gas.	2	Nilson Senior	20-40	1750	5	Wauk.	4-5 x 6 1/2	G,K	4	Yuba	23-35	20-35	4185	2	Wisc.	4-5 1/2 x 7	G,K,D	4	
Farm Horse	B	18-30	1885	4	Clim.	4-5 x 6 1/2	G,K	4	Oil Pull	K	12-20	1085	4	Own	2-6 x 8	K,D	3	Yuba	25-40	25-40	4650	2	Wisc.	4-5 1/2 x 7	G,K,D	4
Farquhar	15-25	.....	4	Buda	4-4 1/2 x 6	G,K,D	3-4	Oil Pull	H	10-30	1750	4	Own	2-7 x 8 1/2	K,D	4										
Farquhar	18-35	.....	4	Own	4-6 x 8	G,K,D	4-5	Oil Pull	E	20-40	2550	4	Own	2-8 x 10	K,D	5-6	Zelle	12-25	.....	4	Buda	4-4 1/2 x 5 1/2	G or K	3		



# COMING MOTOR EVENTS

## AUTOMOBILE SHOWS

Harrisburg, Pa.	Automobile Show	March
Ardmore, Okla.	Ardmore Automobile Dealers' Assn.	March
Madison, Wis.	Automobile Show	March
Denver	Denver Automobile Trade Assn.	Mar. 10-20
Boston	Annual Automobile Show	Mar. 11-18
Newark, N. J.	Newark Automobile Dealers' Assn.	Mar. 11-18
Spartansburg, S. C.	Piedmont Exposition	Mar. 13-18
Boston	Automobile Salon	Mar. 13-18
Omaha	Omaha Automobile Trade Assn.	Mar. 13-18
Great Falls, Mont.	Automobile Show	Mar. 13-18
Greensboro, N. C.	Automobile Show	Mar. 14-18
Port Huron, Mich.	Michigan Automotive Trade Assn.	Mar. 15-18
Logansport, Ind.	Automobile Show	Mar. 16-18
Torrington, Conn.	Automobile Show	Mar. 20-25
White Plains, N. Y.	Automobile Show	Mar. 20-25
Ypsilanti, Mich.	Michigan Automotive Trade Assn.	Mar. 21-22
Denver, Colo.	Automobile Show	Mar. 22-25
Herkimer, N. Y.	Automobile Show	Mar. 23-25
Kingston, N. Y.	Automobile Show	Mar. 23-25
Ann Arbor, Mich.	Michigan Automotive Trade Assn.	Mar. 24-25
Wash'ton, City of	Automobile Trade Assn.	Mar. 25-Apr. 1
Jacksonville, Ill.	Automobile Show	Mar. 27
Oklahoma City	Automobile Show	Mar. 27-Apr. 1
Torrington, Conn.	Automobile Show	Mar. 27-Apr. 1
Ben. Harbor, Mich.	Michigan Automotive Trade Assn.	Mar. 28-31
Quincy, Ill.	Automobile Show	Mar. 28-Apr. 1

Owensboro, Ky.	Automobile Show	Mar. 29-Apr. 1
Bridgeport, N. J.	Automobile Show	Apr. 1-8
Bat. Creek, Mich.	Michigan Automotive Trade Assn.	Apr. 2-8
New York City	Electric Automobile Show	Apr. 3-15
Holdrege, Neb.	Automobile Show	Apr. 5-8
Sioux Falls, S. D.	Automobile Show	Apr. 5-8
Asbury Pk., N. J.	Automobile Show	Apr. 10-15
Buffalo, N. Y.	Motors and Sportsmen's Show	Apr. 10-15
Wins.-Salem, N. C.	Automobile Show	Apr. 11-17
Goldsboro, N. C.	Automobile Show	Apr. 18-22
Chicago	Used Car Show	Apr. 26-May 4
Hartford, Conn.	Automobile Show	Sept. 4-9

## FOREIGN SHOWS

Santiago, Cuba	Annual Automobile Show	March, 1922
Mexico City	Automobile Show	Apr. 16-23
Rio de Janiero	Automotive Exhibition	Sept., 1922

## CONVENTIONS

Decatur, Ill.	3rd Annual Convention, Illinois Automotive Trade Assn.	Mar. 20
White Sulphur Springs, W. Va.	S. A. E. Summer Meeting	June 20-24
Olympia	Washington Automotive Trade Assn.	July 21-22

## RACES

Indianapolis	500-Mile Classic	May 30
San Carlos, Cal.	500-Mile Armistice Day Race	Nov. 11

## STATE INSURANCE PLAN

Albany, March 10—A bill which would create the New York Automobile Owners Mutual Compensation Assn., in which all owners of motor cars would have to be insured at cost, has been introduced in both houses of the legislature. The bill would provide compensation for persons injured or the families of those killed in automobile accidents. It is contended that not more than 25 per cent of the money which automobile owners now have to pay because of accidents ever reaches the injured persons or their families because of litigation, expenses and the profit of insurance companies.

## HENRY COUNTY ELECTS

Galesburg, Ill., March 13.—At the annual meeting of the Henry County, Ill., Automotive Dealers' Assn., officers were elected as follows: President, William Soderberg, Galva; first vice-president, Homer McMullen, Cambridge; second vice-president, C. F. Moberg, Galva; third vice-president, Frank Brown, Osco; secretary, G. R. Galloway, Kewanee; treasurer, Phillip Miller, Kewanee; directors, A. G. Fell, Kewanee, and A. D. Keller, Woodhull. In connection with the annual gathering, B. B. Burns of Decatur, Ill., delivered an address, specializing upon the used car problem.

## SACRAMENTO ASSESSMENT SCALE

Sacramento, Calif., March 13.—A scale of automobile assessment for Sacramento County has been announced by County Assessor B. C. Erwin, and has been adopted by several other counties. Instead of assessing cars on their original purchase price value, they are to be as-

essed on the value of the same model of the make in question at the present time.

New cars are to be assessed at half the cost; year olds at one-third; two years at one-fourth; 1919 models at one-fifth; 1918 at one-sixth; 1917 at one-seventh; and older cars at \$50.

## CANADIANS PROTEST TAX LAW

Montreal, March 10—Concerted action in protest against heavy increases in motor vehicle fees was planned at emergency meetings of the Automobile Club of Canada and the Montreal Automobile Trade Assn. The taxes on passenger cars would be increased from 70 cts. per horsepower to 90 cts. and on motor trucks to \$50 per ton capacity. It was pointed out at the meeting that the tax on a Ford car, for example, would be \$26.70 under the new rate as compared with \$8.75 in New York state. The tax on a McLaughlin would be \$33.90, on a big six Studebaker \$46.50, on a Cadillac \$42.00 and on a Pierce-Arrow \$66.30.

## BANK AIDS SHAFT COMPANY

Chicago, March 14—A committee representing the holders of the \$100,000 7 per cent notes of the Jackson Motor Shaft Co. bearing a March 1 maturity date has been formed. The stock of this company is owned by Earl Motors. As soon as the notes are deposited with the Chicago Trust Co., the bank will pay the interest and make arrangements for extensions. The company is considered by bankers to be solvent but its affairs are entangled with Earl Motors. Both situations are expected to be cleared up in the near future.

## NORTHWAY UNITS AMALGAMATE

Natick, Mass., March 13.—Northway Motors Corp stockholders have voted to amalgamate the three corporations bearing the Northway name. The Northway Motors, Northway Motor Sales Corp. and Northway Motors Guarantee & Discount Corp. All the assets of the three companies were pooled with the formation of the new corporation and it was voted to issue \$400,000 eight per cent three-year gold notes and the stockholders were asked to make contributions of 10 per cent on their stock.

The plant at present is almost shut down, but it is expected to be opened this week and production started on incompleting trucks. There is material on hand amounting to \$500,000 outside the indebtedness of \$100,000. To complete 200 trucks nearly finished will take \$120,000, and when sold they will bring \$780,000. The loss last year was \$217,000.

## NOVEL WINDOW DISPLAY

Hartford, Conn., March 13.—Russell P. Taber, Inc., Reo distributor, hit upon a window display that has attracted much favorable attention. A six-cylinder Reo touring car was turned over on the side, the under body towards the window. The bottom of the crankcase was removed to show the construction. On the window were pasted numerous small cards each conveying a thought about some particular part. Various colored ribbons extended from the cards to the parts noted. A background was formed with scenery from a local theater, this finished in gold with long, swinging, dark-red silk cords. A display of parts was shown on a green-backed board.